

THE Chemical Age

VOL. LXXIII

27 AUGUST 1955

No. 1885

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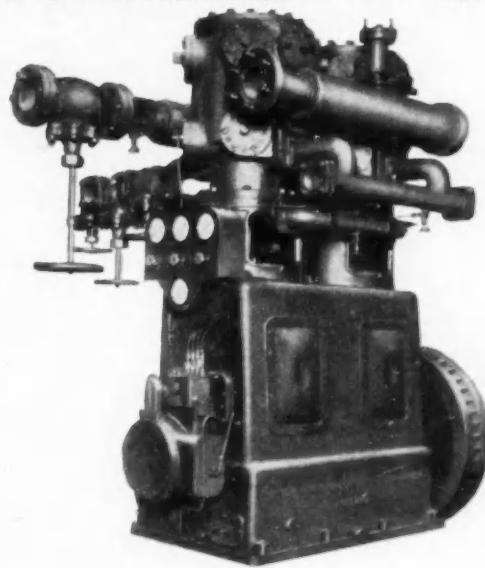
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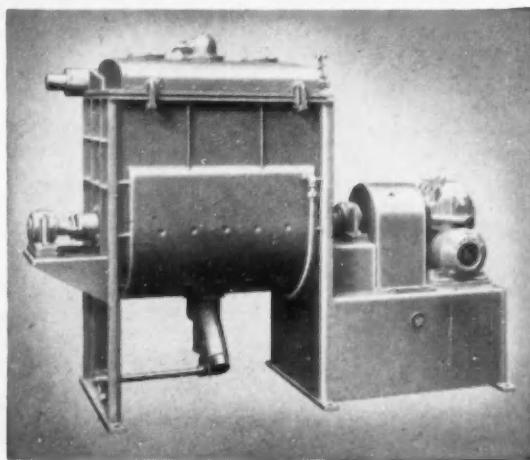
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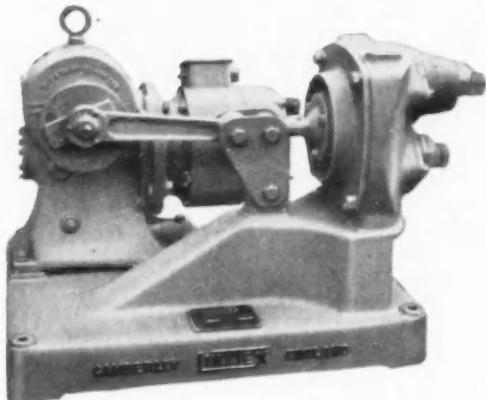
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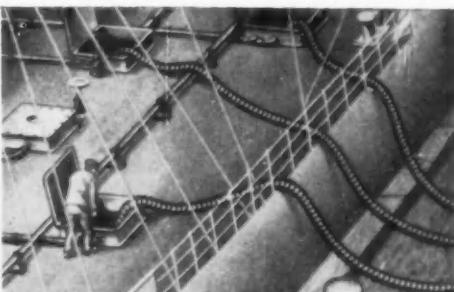
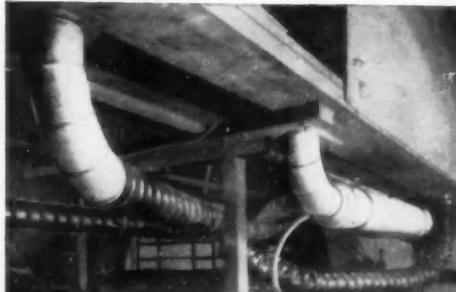
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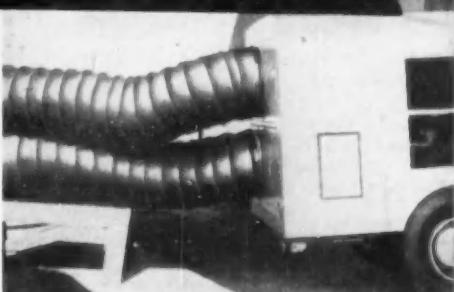
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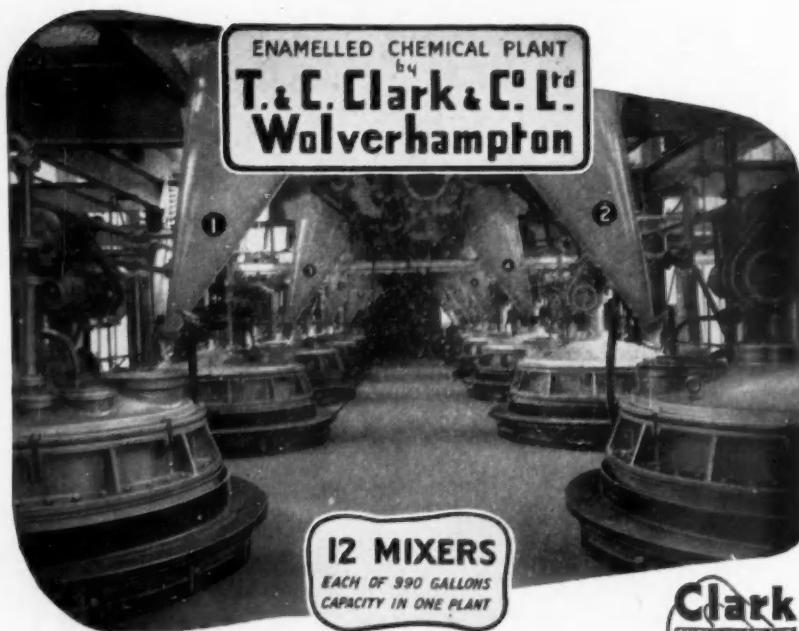
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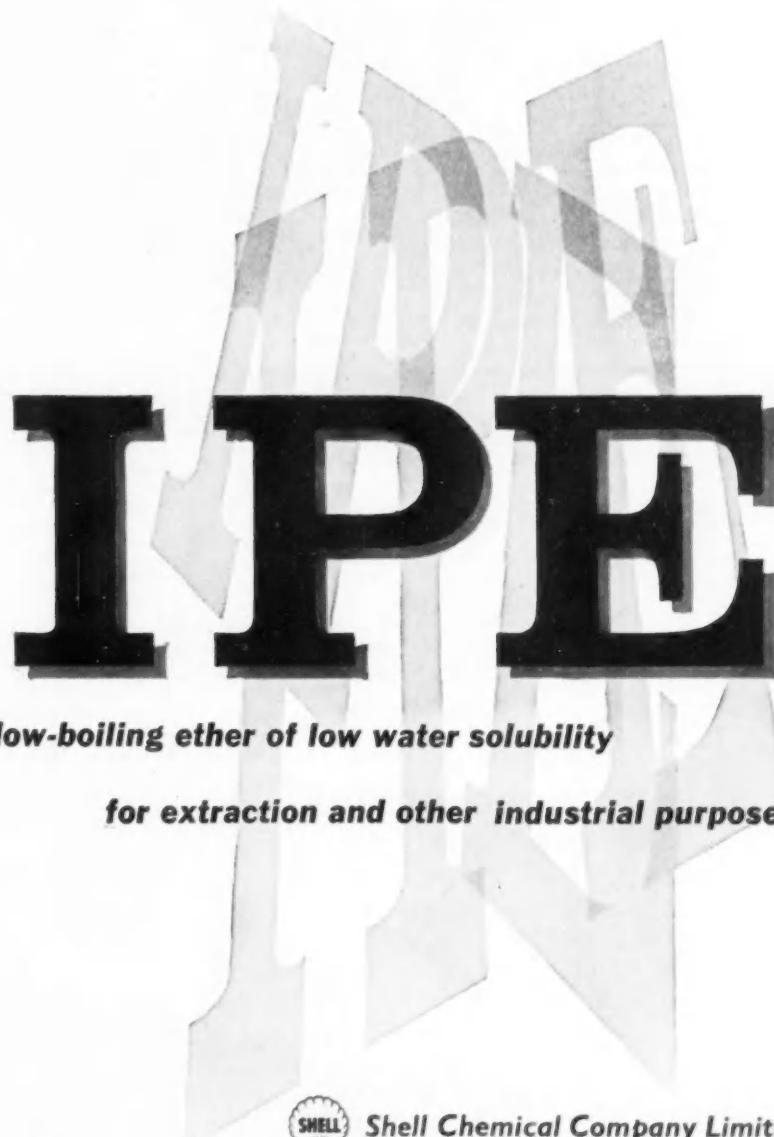
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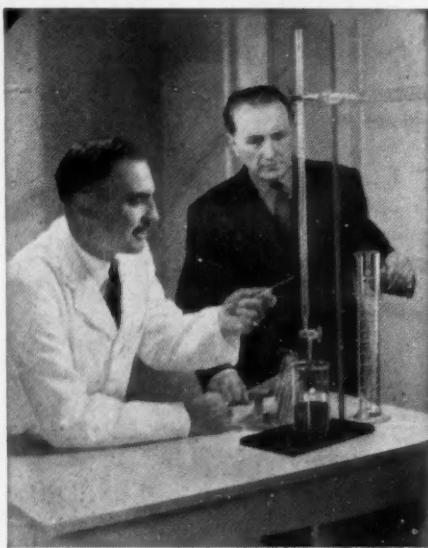
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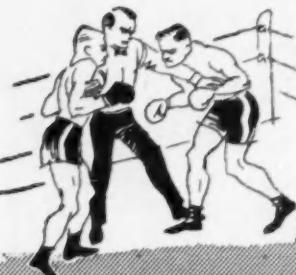
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Editor : E. Arnold Running

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Director : N. B. Livingstone Wallace

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THE critic who is merely wise after the event has little right to a hearing. If we are critical of measures so far taken to avert serious economic crisis, we can hardly be accused of waiting to see which way Mr. Butler's cat has jumped. On the eve of the 1955 Budget (see *THE CHEMICAL AGE*, 1955, **72**, 777) we deplored the possibility of a 'party-political pre-election' Budget and foresaw an unenviable position for both country and Chancellor 'if his Budget releases more internal spending power . . . Those who hope for an easy Budget are ignoring the widening gap in Britain's trading account . . .'

It might be unfair to describe the 1955 Budget as wholly an election-conscious Budget, but it is not unfair to say that it was insufficiently firm. It made no additional contribution to the forces of deflation, and those forces—a two-stage raising of bank rate plus words of exhortation—were even then doubtful enough. As many commentators expected, Mr. Butler has been forced to raise the bank rate yet again and to increase the pressure on the banks to reduce overdrafts and credit.

Economic events since the Budget have moved steadily towards crisis. The docks strike and the rail strike may perhaps be listed as unpredictable, and their effects upon the widening trade gap described as 'unlucky'. The far more serious effect of a steeply advanced price for coal cannot, however, be similarly disposed of—although it fell upon industry and the public as a sudden shock, it was well enough known beforehand to the Government. The damage done by major strikes this summer has been temporary; serious enough but at least non-enduring. The rise in fuel costs

is a permanent burden upon manufacturing industries, a long-term addition to our export prices.

Gloomy prediction is always unpopular in Britain, for its purpose—that of precaution and prevention—is consistently misunderstood. But far more evidence points in the direction of an early economic crisis than in the happier direction of recovery. It is often said that 'controlled' or gently steady inflation creates industrial activity and prosperity. Even if some of the prosperity is illusory, there is substance in the argument—save for those who must continue to exist upon fixed incomes! But we may not be enjoying a 'controlled' inflation any longer. Nor is our rate of inflation generally matched by other industrial countries for it continues steadily here, while it has been checked elsewhere.

These apprehensive comments hardly square with the encouraging views of chemical industry prospects given in last week's issue (1955, **73**, 367-8). Certainly the chemical industry's rising contribution to our export trade is helping to narrow the payments gap. But no one could cheerfully suppose that this single swallow could make a summer, nor that it will remain totally immune to the effects of worsening weather. A crisis must bring sharp reduction in general industrial activity; sterner measures to avert crisis must similarly bring reduction both in manufactures for the home market and in internal spending power.

As so much of the chemical industry's output is sold to other industries as intermediate 'raw' materials, a setback to chemical sales must be regarded as probable. It can be offset by the extent to which reduction in sales at home are

balanced by expansion in sales overseas.

The fact that the chemical industry's export trade is still rising so robustly at least encourages the view that it would fare exceptionally well in any storm that is now brewing. But if prosperity of the chemical section of national industry is relatively more hopeful, it cannot be isolated. It would be damaged far more by the advent of crisis than by the application of restrictive measures firm enough to avert crisis and ensure recovery. It would be most severely damaged by another devaluation—and those who discount this risk should reflect that no other measure will narrow the payments gap if other devices fail.

There is a moral to be drawn by the country as a whole from the chemical industry's steady post-war advancement. It has concentrated upon a twofold policy—the expansion of sales abroad and the manufacture of chemicals at home that were formerly imported. In each direction the activity of the industry has contributed not only to its own prosperity but also to the essential needs of national security. The easier and always tempting home market has not been over-cultivated at the expense of export opportunities.

One of the reasons for this is that the larger chemical companies are world-minded with developed or associated interests in many other countries. The hecklers of 'monopoly' and the critics of industrial-unit size might well digest the hard truth that much of our post-war gain in chemical exports trade has been created by those companies at which the charge of 'colossus' is most frequently levelled. Little would have been possible without the broad base of large-scale operation. Can any but a purblind theorist pretend that nationalisation would have accompanied a similar large-scale activity with the same vision and enterprise? Is it entirely irrelevant to point out that the economic blows of 1955 that have intensified the risk of crisis have all originated in nationalised sectors of industry—the docks, the railways, and the coal mines?

In our pre-Budget leader we ventured to quote from an earlier leader, an attempt to assess the prospects of 1955 at the turn of the year. There was little

sign then that the balance of payments would soon be re-displaying its troublesome gap-widening symptoms. 'And yet—? Is there a catch somewhere? Is it normal to count upon so much stability and prosperity? Only yesterday we were switchbacking from one economic crisis to the next. How sound is our new-won soundness?'

This further re-quotation may seem somewhat self-indulgent, but it disposes of the charge that our present criticisms have waited upon events. The threat to stability and prosperity is now apparent enough. But has it been enough to raise the bank rate in a three-stage process, to tighten hire purchase terms, and to intensify a credit squeeze?

It is the weakness of a Conservative government that it hesitates to adopt unpopular economic measures; equally it can be the strength of the new Conservative government if it now shows this statement to be false. A second 1955 Budget is preferable to a drift towards crisis, and 'drift' is an ill-chosen word if it happens to suggest slow movement. Inflationary pressure is not nearly as serious in Germany—if her trade balance has fallen, it is still a positive balance and not a gap. Even in crisis-ridden France a payments deficit has now been turned into a surplus. If our competitors' houses are in improving order, the deteriorating state of our own is all the more serious.

This gloomy picture can at least be brightened by one favourable turn of home events. The 1955 harvest seems almost certain to be one of record yield and quality. One of the most severe rises in imports in the past twelve months has been that for animal feeding stuffs, a consequence partly of de-control and partly of 1954's weather-afflicted harvest. A significant curtailment in this expenditure upon imports, especially where dollars are involved, should be possible. If this is done, the effect should not be merely temporary or fortuitous; for farmers will regain lost confidence and increase their application of modern scientific methods—especially the greater use of fertilisers—in growing future crops. Here again, the contribution of the chemical industry towards national stability still has enormous potentiality.

Notes & Comments

US Journals Dearer Here

BRITISH subscribers to the journals of the American Chemical Society are going to find their future reading more costly. In a recent Note (THE CHEMICAL AGE, 1955, 72, 1133) attention was drawn to the sharp increase in price for *Chemical Abstracts*, but rising production costs have upset the balance sheets of all ACS publications. Non-American and non-member subscribers have been selected for particularly stiff increases in subscription rates, and this is a reflection of the policy of trying to keep prices low by attracting high advertising revenue. It is argued (*Chemical and Engineering News*, 1955, 33, 3110) that the US advertiser is uninterested in foreign circulation; what he is prepared to pay for space in these journals is not influenced by the numbers of copies sold outside the United States. None of the benefit of costs-reduction from advertising revenue should, therefore, be applied to lowering the prices charged for foreign sales. Substantial increases for foreign non-member subscribers, except in Canada, have been voted by the ACS whilst member rates remain unaltered. That journals must cost more in future can hardly be disputed in face of the statement that a deficit of nearly \$400,000 had to be carried by the ACS in 1955 for their main publications. This is partly explained by their increase in size, which has not been proportionally accompanied by increases in price. Rapid and extensive rises in the price paid for paper and increases in labour and printing costs must be other causes.

Hard Luck

IT certainly seems a little hard that the only increases in price should be levied upon foreign subscribers. Production costs per copy have risen without any relationship to destination. However, it is one of the perpetual pains of expanding science that its literature must cost more and more. As far as this field is competitive—which it is not to any

great extent, for genuine students need all the publications they can get and would not adopt a 'one-or-the-other' policy from free choice—these sharp advances in US journal prices may create some opportunity for sales of British journals in other countries. The world market for our own scientific journals and technical publications has probably been under-exploited. During the long years of page-slimness we may have had little to offer, but that is not the case today. Nor, we think, would most British advertisers regard foreign circulation as worthless; overseas inquiries can produce hopeful opportunities of expanding export trade in chemicals, apparatus, or chemical plant.

Chemicals in France

FRANCE is the latest subject of the *Financial Times'* country-by-country surveys, and one of the articles is naturally concerned with her chemical industry. France now takes fourth place among the chemical exporters of the world, a notable recovery of position in view of the fact that in 1945 her total production of chemicals was only one quarter of its pre-war level. Today production is about twice the pre-war level, and to reach this level of expansion from one of such serious contraction in only ten years is a notable achievement. The pattern of recovery has varied for classes of product. Heavy inorganics have not generally advanced much above their pre-war figures. Carbon disulphide, nitric acid, and synthetic ammonia have made expansions well above the average, however. Organics have risen substantially as a result of 'chemicals-from-oil' ventures, and good progress has also been made in coal chemicals. The backwardness of the industrial organic chemical industry in France has been realised and virtually removed. Since the war most companies of any size have invested heavily in research and new laboratories. Production of plastics is seven times its pre-war annual tonnage, and plenty of further progress and expansion can be expected in this modern section.

Natural Gas

AN exciting prospect for the future is the utilisation of the natural gas at Lacq in Southern France. An entirely new industrial centre based upon this gas may well be developed though any certainty of this depends upon the cost of distributing the gas. This discovery of a new and apparently abundant fuel reserve not only fits in with the material requirements of modern organic chemistry, but it also suits the French policy of developing industry outside her concentrated industrial areas. Its vigorous exploitation is likely, therefore, to receive every possible encouragement.

More Sulphur

MEXICAN sulphur is no longer a doubtful addition to world reserves. The Frasch process is being applied to it and an annual output of about 1,000,000 tons is predicted for 1956. The present product is dark in colour, a restriction on its use in fine chemical processes. For the major use of acid production, however, this is hardly a significant disability. The reserves of sulphur in Mexico are believed now to be much larger than was originally supposed—something above 50,000,000 tons. A recent article, particularly well endowed with new data (*Chemical & Engineering News*, 1955, 33, 3152), suggests that the US sulphur industry is not quite as confident that Mexican sulphur will not eventually become a sizeable competitor. The cost of Frasch sulphur is principally governed by the gallonage of water required to raise a ton of sulphur—water and the fuel to heat the water are the main costs. For two of the three present Mexican installations, the water requirement per ton is favourably low, or at any rate not above the US average in one case and much below it for the other. Initially Mexican sulphur was being quoted at the same price as dark US sulphur; it is reported that recent quotations have been running as much as \$3.5 lower. The same report indicates that British purchases are not being attracted away from America in recognition of the fair treatment given during the acute sulphur

scarcity period. No one fully aware of the facts about US export allocations of sulphur at that time would criticise this policy. The tonnage exported was sent in the face of fierce criticism from some parts of the US chemical industry.

Welcomed

NEVERTHELESS, the practical development of a new Frasch sulphur industry must be welcomed in Europe. No natural monopoly within one country's boundaries is desirable and the American monopoly in low-cost sulphur has had a long enough run. Balanced American opinion will take the same view. Monopolies of this kind can be as bad for the producer as for the consumer for the real force of competition is much too easily stifled. The market for sulphur is large enough and less uncertainty about supplies can expand it.

Potash Nitrate Changes

STARTING 1 September the agricultural prices for granulated Chilean potash nitrate 15 per cent nitrate, 10 per cent K₂O, and 20 per cent sodium, in lots not less than six tons will be:

September, £29 5s.
October/November, £29 10s.
December/February, £29 15s.
March/June, £30.

All these prices are per ton of 2,240 lb. gross weight. Smaller lots are subject to the following surcharges:

4 tons and over, but less than six tons	5s. per ton		
2 tons "	" four "	10s. "	"
1 ton "	" two "	20s. "	"
1 cwt. "	" one "	30s. "	"

Spanish Plant Tenders

The Empresa Nacional 'Calvo Sotelo' in Puertollano recently called for two tenders for the planning and erection of plants for the roasting of 160 tons per day of pyrites and for the production of 200 tons per day of sulphuric acid.

Anyone interested is invited to write to the Instituto Nacional de Industria, Lista 40-primer, Madrid, for condition sheets.

Offers should be received before 31 October and 15 November respectively.

International Biochemistry Congress

by K. R. REES, M.Sc., Ph.D.

OVER 2,000 delegates from 40 countries attended the third International Congress of Biochemistry at Brussels from 1 to 6 August. A large Russian delegation participated.

Several main lectures were given, the opening one being delivered by Professor C. Martius (Germany) who discussed investigations into the mode of action of thyroxine and its connections with oxidative phosphorylation. The closing Congress lecture was given by Professor V. du Vigneaud (US) who described contributions of his laboratory on the isolation, chemistry and synthesis of the posterior pituitary hormones. The original communications were subdivided into 17 sections depending on their subject matter. Two or three review lectures were given in each section by well known workers in that particular field.

The subjects of the sections were: organic chemistry of substances of biological interest, the chemistry and physical chemistry of proteins and polypeptides, chemistry and nucleic acids, enzymology, intermediary metabolism, cellular oxidations and oxidative phosphorylation, biochemical regulation, biochemistry of muscle and the central nervous system, microbiological chemistry, botanical chemistry and biochemistry of the soil, zoological chemistry, nutrition, pathological chemistry and immunochemistry, and industrial biochemistry.

Industrial Section

The industrial biochemistry section was small and contained only six contributions. These were concerned with the growth of moulds and production of antibiotics. W. H. Peterson, E. G. M. Tornquist and R. F. Anderson (US) investigated the effect of the addition of oil to a medium containing pigmentless cultures of *penicillium chrysogenum*. The addition of oil to the medium resulted in an increase of 30 per cent in the yield of penicillin. F. Dentice Di Accadìa (Italy) reported that *p. chrysogenum* can utilise oils and pure triglycerides as a sole carbon source for growth and penicillin production.

Other workers showed that auromycin synthesis by *streptomyces aureofaciens* was inhibited in the presence of potassium ortho-

phosphate. The orthophosphate was found to inhibit carbohydrate metabolism with the accumulation of pyruvate. B. Chain (Italy) gave a report in connection with this section dealing with carbohydrate metabolism of moulds. He considered the problem of the production of oxalic acid by moulds. It is generally agreed that oxalic acid is produced via the tricarboxylic acid cycle but as yet it cannot be decided whether the precursor is oxalosuccinic acid or oxaloacetic acid. Present evidence points to the latter as the most likely source.

Biological Section

In the section dealing with substances of biological interest a number of workers described new syntheses. The synthesis of new analogues of hormones of the adrenal cortex and of analogues of steroid hormones oxygenated in the 19 position were reported. H. J. Bell and L. B. Jaques (Canada) demonstrated species differences in heparin. Heparins of several species showed wide differences in anticoagulant activity and anti-thrombin activity. By partition chromatography heparins were separated into several components showing definite species differences.

The chemistry and physical chemistry of proteins occupied one of the largest sections. H. Borsook (US) reviewed the work on the biosynthesis of proteins. He supported the view that proteins were synthesised from separate amino acids, i.e. 'templet' theory and not from preformed peptides. T. Work (UK) supported this view but pointed out that in his laboratory, liver extracts had been found to contain large numbers of small molecular weight peptides. One must presume that these peptides serve some function other than acting as building blocks for proteins.

Papers given in this section dealt with the isolation and purification of proteins and peptides. D. T. Elmore, J. R. Ogle and P. A. Toseland (UK) described a new method for the stepwise degradation of peptides from the end bearing a free amino group. The end group was reacted with methyl N-acetyl or N-benzoyl dithiocarbamate, this end amino acid was then hydrolysed off and

the whole process repeated. Application of this type of method is giving information as to the amino acid sequence in peptides and proteins.

Reviews on nucleoproteins and nucleic acids dealt with their chemistry and physical properties. In this field workers had continued to investigate the isolation and purification of nucleic acids. A study is now being made on the pyrimidine nucleotide sequences in the nucleic acids. P. W. Kent, P. F. V. Ward and C. S. Ennis (UK) replaced purines in desoxynucleic acids by ethyl mercaptyl residues; the molecule was then alkali degraded and the degradation products separated on resin columns.

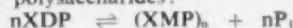
Nucleic Acids

Nucleic acids are of increasing interest to workers in the cancer field. In connection with this aspect was the paper by L. Ledoux (Belgium) on the action of ribonuclease on the growth of neoplasms.

It was found that ribonuclease *in vivo* considerably limits the growth of ascites tumours and also limits the growth or increases the regression of other tumours such as spontaneous mammary tumours.

A large number of reviews were given on the more classical aspects of biochemistry; in the sections on enzymology, cellular oxidations, etc. There did not appear to be any new advances in these sections but rather an expansion of our present knowledge. Enzymes and enzyme systems connected with oxidative phosphorylation have yet to be isolated. E. Slater (Holland) reviewing this subject put forward a possible mechanism for oxidative phosphorylation but described our present knowledge in the field as rudimentary.

Since the last Congress, three years ago, there has been a great deal of work on enzymatic synthesis. In this field there were two interesting papers. W. K. Maas (US) described the synthesis of pantothenate from alanine and pantoate with enzyme preparations from *Escherichia coli*. This compound is of interest in that it contains a peptide link, the key link of proteins. Another important synthesis with bacterial preparations was that of polynucleotides. M. Grunberg-Manago and S. Ochoa (US) proposed that a reversible phosphorolysis takes place in the synthesis and degradation of polynucleotides, analogous to that occurring in polysaccharides:—



(where X may be adenine, hypoxanthine, guanine and possibly other bases). This reaction may be of great importance in view of the fact that it is now realised that these bases form part of co-enzymes playing an important role in intermediary metabolism.

The view has been held for some years that the synthesis of proteins is closely connected with nucleic acids. F. Gros-Doulcet and S. Spiegelman (US) considered such correlations. They found that a selective suppression of desoxyribonucleic acid (DNA) permitted virtually normal induced synthesis of an enzyme β -galactosidase by *Escherichia coli*. However they demonstrated that the synthesis of ribonucleic acid and enzymatically specific proteins occurred under conditions where DNA is metabolically inert. In studies on the bacteriophage, K. Burton (UK) reported that after the infection, the protein must be synthesised before the synthesis of DNA can commence.

In the section on nutrition, reviews by L. Y. Quinn (US) and by M. E. Coates and S. K. Kon (UK) were devoted to antibiotics and growth. Although the growth promoting effects of antibiotics depend to a large extent on their antibacterial properties, other factors such as asceptic environment, direct effect on the animal's metabolic processes and the genetics of the animal must be considered.

Papers on B_{12}

A number of original papers were given on B_{12} . B. C. Johnson and S. P. Mistry (US) investigated the function of the vitamin. Studies were made on the chick and the baby pig which are very sensitive to B_{12} deficiency. B_{12} was not involved in direct transmethylation but was required for the synthesis of methyl groups from glycine. There were several papers on the purification of Castle's intrinsic factor. Evidence was obtained that confirms the concept that in the B_{12} -intrinsic factor complex, the vitamin acts as a crosslinkage.

The application of analytical techniques to disease were described in the sections on pathological and clinical chemistry.

W. G. Dangerfield and E. B. Smith (UK) applied paper electrophoresis to a study of lipoproteins in coronary thrombosis. Normal sera show two or three component of α -lipoprotein and a dense β -lipoprotein band. In several pathological conditions the α -lipoprotein is reduced. Striking changes occur

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Cashew Nutshell Resins

Important Uses in the Plastics Industry

A LIQUID of growing commercial importance is extracted from the outer shell of the cashew seed. This seed is carried at the end of the pear-like fruit of the tree *Anacardium occidentale*. Originally a native of the American tropics, the cashew nut tree was transported to Africa by the Jesuit Fathers in the 17th century, and thence to India. To-day it is widely distributed, being found on coastal sandy plains all round the world within the limits of 15 degrees north and 15 degrees south of the Equator.

The chemistry of resin preparation from the cashew nutshell has been described in some detail by Evans (*Rubber & Plastics Age*, 1955, **36** [5]). Briefly, the raw liquid isolated from the cashew nut consists mainly of the salicyclic derivative anacardic acid (2-carboxy 3-pentadecadienyl phenol), together with a minor quantity of cardol, which is primarily metapentadecadienyl resorcinol.

The heat applied during the extraction process causes substantial decarboxylation of the anacardic acid, yielding a monohydric phenol known as anacardol. A mixture of monohydric and dihydric phenols is obtained, the substitute group in each case being a linear chain containing two double bonds. Some polymerisation occurs with some loss of unsaturation. Further treatment of the cashew nutshell liquid by a normal distillation process yields cardanol, which has only one double bond. The non-distillable fraction is an unsaturated polymer which contains the cardol.

Three Basic Materials

The shell of the cashew nut is thus the source of three basic raw materials, namely the treated liquid (which for convenience may be designated CNSL), the polymer, and cardanol. Each of these products may be subjected to a variety of treatments such as polymerisation, condensation with aldehydes, etherification and hydrogenation. A wide range of materials with different combinations of desirable properties is thus obtained.

The unsaturated side chain in the structure of CNSL can be utilised in achieving

linear polymerisation, which is the most important of the cashew reactions. By adjusting the conditions of the reaction, both the physical and chemical properties of the polymer may be varied within wide limits. Increase in viscosity is accompanied by a corresponding increase in the aldehyde reactivity of the polymer.

Acid Catalysts

Polymerisation is most readily accomplished by heat with the use of acid catalysts, but both alkaline catalysts and heat alone without the addition of a catalyst can also be employed. The products of the reaction range from brown viscous liquids to hard rubbery polymers, depending on the time of polymerisation.

Mixed polymerisation etherification products are obtained by heating CNSL with another phenol, such as cresol or resorcinol, in the presence of sulphuric acid.

The products of these reactions can in turn be reacted with aldehyde or aldehyde donors to give cross-linked materials, or they may be emulsified in water and cross-linked *in situ* after application by the addition of the aldehyde or aldehyde donors.

As an example, the reaction product with formaldehyde is a rubbery, infusible and insoluble solid possessing excellent acid and alkali resistance. This reaction does not require heat and the hardness of the gel can be controlled by the proportion of aldehyde added. Cross-linkage with oil reactive resols and similar resins capable of donating formaldehyde requires the use of heat, but oxidation is not necessary to cause gelation.

Cashew nutshell liquid and its derivatives can also be reacted directly with aldehydes without previous polymerisation, usually with ammonia or sodium hydroxide catalysts, to produce thermo-hardening resins. The formaldehyde condensation reaction proceeds in a manner similar to that of the phenol formaldehyde reaction, but the resulting resins have important features which are attributable to the presence of the long carbon chain substituent. They are more flexible than ordinary phenolic resins when cured and are readily soluble in both aliphatic and aromatic solvents.

The long carbon chain also leads to softening at high temperatures and probably contributes largely to the excellent acid and alkali resistance which is characteristic of this group of resins.

It follows that the flexibility, solubility and compatibility characteristics or alkali resistance of conventional phenol formaldehyde resins can be improved by co-condensation of CNSL with the phenol and formaldehyde.

UK Licence Acquired

The Irvington Varnish & Insulator Company of the US was the first firm to market resins and polymers based on cashew nutshell liquid. Before 1939 these products were almost unknown in Britain, but during the second world war their technical importance was fully realised and a licence to manufacture was acquired by British Resin Products Ltd. Development work has been in progress for several years and has led to the introduction of a comprehensive series of polymers and resins, which are finding a growing number of applications in widely differing fields.

Polymers of CNSL can be suitably activated so that reaction with aldehydes such as paraformaldehyde will take place in the cold. The first stage is the formation of a rubbery gel which hardens over a period of days. The hardening rate can be accelerated, if desired, by the application of gentle heat. The set mass adheres well to brickwork and steel.

Resins of this type are the basis of acid and alkali resisting cements which are available in a range of viscosities and setting times to suit particular applications. They are usually extended with an inert filler such as silica or carbon. These acid resistant materials are filling many needs in the chemical industry and are also finding applications in other industries where corrosion problems are presented, as in steel pickling tanks.

They are also used for the cementing of floors which are subjected to attacks by alkalis, or which are occasionally washed with caustic solutions, as in dairies. Another purpose for which cashew resins are extensively employed is for the impregnation of various grades of carbon used in the fabrication of heat exchangers, which are thus rendered impervious to acid and alkaline liquors.

CNSL resins have unique resistance to mixtures of hydrofluoric acids, such as are used in the de-scaling of stainless steel. On the other hand, their resistance to aromatic and chlorinated hydrocarbon solvents is, in general, not very great.

Cashew polymers are compatible with a wide range of resins and drying oils used in surface coatings where acid and oil resistant characteristics are required. This field of applications is limited, however, because most of the products are brown or black in colour and also because of their slow rate of air-drying. Recent research has indicated, however, that considerable improvement in both these respects may not be long delayed.

Where colour is a secondary consideration, the use of CNSL resins offers important advantages for surface coatings. The cashew product confers outstanding water resistance on the coating, while grinding is facilitated by its excellent wetting property in respect of pigments. Coatings of good solvent resistance are prepared by combining a cashew polymer with a formaldehyde donor such as etherified urea-formaldehyde resin. The formaldehyde derived from the urea resin serves to crosslink the CNSL polymer, which in turn plasticises and confers resistance properties on the urea component. Coatings of this composition are extensively used for bottle cap liners and also for refrigerator enamel type finishes where darker colours are employed.

Epichlorhydrin Reaction Products

Epichlorhydrin reaction products have been prepared from CNSL derivatives and promise to give more flexible coatings than conventional epoxy resins, but their possibilities have not yet been fully investigated.

Certain liquid polymers possess the property of reacting with aldehydes at room temperature to form infusible masses. These products are known as 'oil stops' and are used for all types of filling and sealing compounds to exclude oils, solvents, acids, alkalis, water, etc., particularly where a high degree of resilience is essential to ensure a permanent seal, as in the sealing of electric cable splices. Normally eight per cent of paraform is added to sealing compounds, but setting will occur with only three per cent. By careful choice of polymer and the amount of paraform, the speed of setting can be controlled within wide limits.

A gelatin reaction which is independent of atmospheric oxidation is associated with another type of CNSL polymer, suitable for use in electrical applications. This property is employed in the formulation of insulating varnishes which are required to dry in thicknesses and under conditions which preclude the possibility of oxidation.

Polymers of this type are usually employed with other resols or resins and the properties of the resulting gel can thus be modified in many ways. The main use is in insulating varnishes of the stoving type where deep curing properties and through drying are required. By a judicious choice of donor resin and non-reactive component, however, it is possible to formulate insulating varnishes for use in many other types of applications. The production of solventless insulating varnishes based on cashew resins and polymers has also been investigated.

Used in Rubber Compounding

Cashew products are also extensively used in rubber compounding. Fast-curing CNSL-modified phenol formaldehyde resins are incorporated into synthetic rubbers, such as the nitrile rubbers, to reinforce tensile strength, modulus, hardness and abrasion resistance. The fact that they soften initially during compounding contributes to ease of processing and eliminates the disadvantages associated with the plasticisers which would otherwise be required. By curing simultaneously with vulcanisation, these resins also form an intrinsic part of the binder system, so increasing the resistance of the product to ageing, chemical attack, and the action of solvents and oil.

In rubber and Neoprene printing rollers and lithography blankets, a cashew polymer enhances resistance to the various acids used in printing inks.

Hycar/Phenolic Resins

Hycar/phenolic resins are employed in the production of hot-setting adhesives. For this purpose they are dissolved in a solvent such as methyl ethyl ketone, together with a curing agent such as hexamine. Typical applications of these adhesives include the bonding of metals to metals, metals to wood, phenolic laminates and mouldings, glass, nylon, PVC, and brake linings to brake shoes.

Another important use for cashew resins

is in the production of 'cold-punching' laminated boards. Modification of the phenolic or cresylic resin by co-condensation with a CNSL derivative makes it possible to reduce the brittleness of the board without using a plasticiser which cannot be chemically linked with the resin.

The higher cashew polymers are used as intermediates in the preparation of fully thermo-hardened resins, which, when ground to dust, find applications as friction-modifying materials in the manufacture of brake linings and clutch facings. The heat generated in applications of this nature causes these dusts to soften without undergoing chemical change. A marked increase in performance at higher temperatures is obtained when 5-15 per cent of CNSL friction dusts are used in the production of brake linings.

CNSL derivatives of a suitable type serve as binder resins in conjunction with cashew friction dusts for brake lining processes.

Cardanol, the product obtained from CNSL by distillation, may be employed as a plasticiser for a wide range of materials, notably phenol formaldehyde resins. The ethers of CNSL have been used as plasticisers for rubber where low temperature conditions are liable to be encountered, as in aeroplanes. The linoleum industry employs CNSL polymers as binder resins. Other applications which have been suggested include wetting agents, anti-sludge agents for lubricating oils, azo dyestuffs, and petroleum antioxidants.

Fuel Study

SCIENTISTS employed at British Petroleum's research establishment at Sunbury-on-Thames have returned from Algeria where they have spent eight weeks conducting road tests with a fleet of cars to learn more about the performance of petrol and engine oils in hot temperatures.

The tests were part of a comprehensive research they are making of volatility and the relationship between ambient temperatures and engine temperatures. Later this year another team of scientists will go to Scandinavia to carry out similar tests under cold weather conditions.

Dublin Pyrones Symposium

A THREE-DAY symposium on recent advances in the chemistry of naturally occurring pyrones was recently concluded in the Department of Chemistry, University College, Dublin. The symposium was organised by University College and the Institute of Chemistry of Ireland to mark the 40th anniversary of the first paper on flavones published by Professor Hugh Ryan who was Professor of Chemistry at University College, Dublin, from 1899 to 1931. This branch of chemistry has been systematically studied in Dublin since 1915 and a number of useful syntheses have been devised.

The meeting was opened by Professor T. S. Wheeler on behalf of Dr. Michael Tierney, President of University College, Dublin, and some 130 chemists from 12 countries took part.

In recent years there has been a revival of interest in the chemistry of pyrones and this was clear from the papers presented. A list of these papers is given in *Chemistry and Industry*, 1955, 732.

Monel Anniversary

THIS year marks the 50th anniversary of the production of Monel alloys by the International Nickel Company of Canada.

These alloys, the first of which contained two-thirds nickel and one-third copper, take their name from Ambrose Monel, the patentee of the original method of manufacture, who was at one time president of the company.

In the first 50 years of production, from 1905 to the end of 1954, nearly 900,000,000 lb. of Monel alloys were shipped to a wide variety of civilian and defence industries, said Mr. John F. Thompson, chairman of the board, in a statement to shareholders. This would have been very much greater, he said, if defence needs and stockpiling had not necessitated the diversion of nickel from many normal industrial channels.

Air Pollution Problem

LANARKSHIRE County Council proposes to establish seven observation stations for the investigation of air pollution. In the county last year there was a marked increase

of grit deposits in the Carmyle area; and storms caused the chloride content of the soluble matter to be higher than normal. Mr. A. C. Wilson, the county's public analyst and chemist, commenting on the research, considered there would be difficulty in getting sufficient qualified staff.

During last year stringent regulations resulted in one firm reducing the amount of sulphur burned into the air by nearly 900 tons. Mr. T. B. Pollock, chief sanitary inspector, in his annual report states that the problem of air pollution is serious. 'It was surprising', he said, 'to have to deal with a complaint of smoke pollution from the premises of the Department of Scientific & Industrial Research at East Kilbride, which is unfortunate in that it is sited too close to dwelling houses'.

International Biochemistry

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in the β -zone in nephrosis, myxodema, xanthomatosis and hyperlipaemia.

S. W. P. Jenk and E. L. Durran (US) described a method for the study of lipoproteins. The lipoproteins were separated by electrophoresis, followed by the uptake of a lipid dye. Results were given of analysis of mucoproteins in urine and serum. High values occur in patients with cancer, the more wide-spread cancers giving the highest values.

A number of interesting reviews were given in this section. H. Harris (UK) discussed amino acidurias and subdivided the condition into two groups, one where there is a defect in metabolism and the amino acid concentration builds up in the blood and 'overflows' into the urine and a second group where the kidney tubule fails to re-absorb an amino acid or amino acids.

An exhibition of scientific instruments was held by European and United States firms. A range of spectrophotometers, centrifuges and electrophoresis apparatus was demonstrated.

A series of social events were held during the week of the Congress. An evening reception was held in the halls of the Musées Royaux d'Art et d'Histoire du Cinquantenaire, one of the finest museums in Belgium, and visits were arranged to Ghent, Bruges, Malines and Antwerp.

New Nylon Moulding Compound

Product of Allied Chemical & Dye Corporation

LARGE-SCALE production of a new type of nylon moulding compound was recently commenced by the Barrett Division of the Allied Chemical & Dye Corporation, US. The new nylon compound, according to T. J. Kinsella, president of the Barrett Division, opens up a wide range of new applications for nylon in industrial and consumer products. The new material, known chemically as caprolactam-type nylon, is also called nylon 6, and has the trade name Plaskon Nylon 8200.

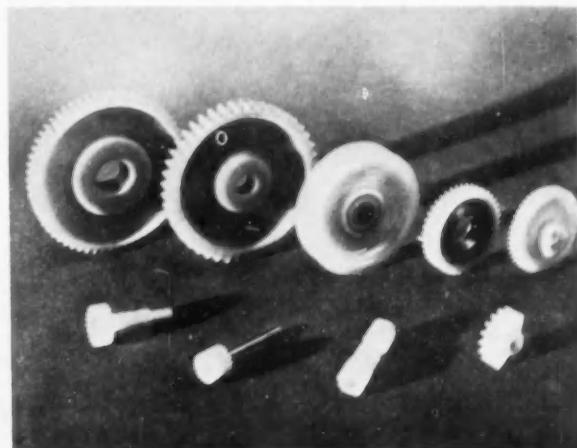
The material is said to offer interesting new possibilities to moulders and extruders. It has a high tensile strength, excellent abrasion resistance, light weight, self-lubricating properties, good resistance to chemicals, high heat resistance, and excellent impact strength and toughness. It is possible to produce larger parts with thicker sections because of improved moulding properties. Typical applications for the new material include gears, bearings, bushings, wire jacketing and cable coating, valves, instrument housings, and coil forms.

Because the new nylon can be extruded easily and has a controllable crystalline structure, it can be formed into a clear film having a high strength, and abrasion and heat resistance. In its unorientated state, this film will probably be used as a laminating material, for tapes, and as sheeting for

conveyors. Special production treatment can improve the physical properties of the film; it can be made thinner and will have many applications in the packaging field. The suitability of Plaskon for bottles opens up new possibilities for the packaging of chemicals.

In the first stage of the production of this material the Barrett Division produces phenol from benzene, petroleum gas, and air. The phenol is then taken by rail to a plant at Hopewell, Virginia, where it is reduced to cyclohexanone by synthesis gas; the latter is obtained from the company's Nitrogen Division. Ammonia, sulphur, and air are then reacted to form hydroxylamine; from the latter, cyclohexanone oxime and caprolactam are produced. The caprolactam is then polymerised at the new polymer plant of the company's National Aniline Division at Chesterfield, and is made into Plaskon Nylon 8200. The Barrett Division is responsible for marketing the finished product.

Nylons as a class have presented a peculiar problem to moulders. Below some temperatures they are too solid to extrude or injection mould. Above the lowest workable temperature they rapidly become so fluid that they are difficult to contain. Plaskon has a relatively high molten viscosity which, to a great extent, eliminates the problem of leakage from nozzles and joints.



Gears and pulleys of many sizes and shapes can be moulded economically and to close tolerances from the material



This illustration shows the detail possible in nylon mouldings for both small and large parts

It is particularly adapted to blow-moulding, but this practice is generally considered to be impracticable from a commercial viewpoint. As methods of taking advantage of this higher molten viscosity are discovered, however, many other new applications should be possible.

The photograph below shows a series of Plaskon discs which were moulded under the same conditions, but at different temperatures. The thickness of each sample is graduated in three steps—0.020, 0.045, and 0.070 in. It will be noted that the thickest section of each piece is milky in colour; this demonstrates crystal formation due to high heat containment caused by greater thickness. In the thinner sections at the lower mould temperatures, the substance is much clearer because the crystallisation process was stopped by quick cooling in the mould.

As a result of this study it was found that, by moulding Plaskon at low temperatures, maximum impact strength or toughness with minimum mould shrinkage could be obtained. As the mould temperature increases, the substance becomes more rigid, but even at 200° F it is not brittle. This unique characteristic of controlled crystalline structure allows the moulder or extruder to vary the finished product's final physical properties in thin sections.

The combination of high molten viscosity and controlled crystalline structure gives Plaskon good moulding properties. In addition, it does not decompose or liberate gas during the moulding or extrusion cycle. This permits very thick sections or very

large pieces to be moulded with a minimum of voids caused by trapped air or gases.

Plaskon nylon can be cold-coloured after moulding, a technique which might be useful when making many colours in short runs, and when only a few millimetres of colour depth is required. For moulding fully coloured pieces, a simple blending of colour with the charge before moulding will produce excellent results. For very deep colours, a master batch and a blending operation can be used.



Plaskon discs, graduated in thickness

Parts moulded from Plaskon nylon in natural colour are opaque white. Easy recovery without development of colour will permit a nearly 100 per cent yield on every pound. Cutting and redrying techniques well known by nylon moulders permit full recovery of sprues, runners, and occasional spoiled pieces.

The amide grouping is not completely water repellent, hence nylons absorb some moisture after moulding in the nearly anhydrous state. This is an equilibrium phenomenon, and has little effect on the final piece except to increase the strength and impact resistance at the expense of the tensile strength. No evidence has been found that many cycles of saturation and drying will affect the product. Water absorption, under normal conditions, is about one per cent.

The company expects that nylon will become increasingly used as a moulding material in the future. Although it is the highest priced of the common plastics, its great versatility coupled with phenomenal strength permits it to compete with less costly materials.

Increase & Decline

THE market for distillate fuel oils last year continued the upward trend of recent years, while sales of residual fuel oils showed a decline and those for kerosine only a small gain, according to a survey made by the Branch of Petroleum Economics, Bureau of Mines, US Department of the Interior. Sales of distillate grades of fuel oil increased by 8 per cent, compared with a 2 per cent gain in 1953. Distributors reported a decline of 8 per cent for residual fuel oil in contrast to an increase of 2 per cent in 1953. A gain of 3 per cent in kerosine sales in 1954 compares with a decline of 7 per cent in 1953. Exports of distillate fuel oil were lower by a quarter in 1954 and those for kerosine by a third.

Isotope Prices Reduced

THE United Kingdom Atomic Energy Authority has reduced the price of two of the most important radio isotopes used in medicine. They are iodine 131, and colloidal gold 198, both of which are distributed by the Radiochemical Centre at Amersham, Bucks.

This reduction has been made possible by continued demand and improved manufac-

turing facilities. The saving to the average isotope user will be about 20 per cent. Although short-lived—iodine loses half its activity in eight days, the gold about a half in three days—the Radiochemical Centre provides sufficient activity to compensate this loss. Delivery can be made at short notice to any part of the world by air.

Sulphur in Sicily

THE search for sulphur deposits made by the Sulphur Producers of Caltanissetta in the Sommatino district of Sicily has been rewarded, and mechanical explorations are now being made to ascertain the extent of the deposits. The Texas Sulphur Co. have requested a concession and this has caused Lanza di Scalea, president of Ente Zolfi Italiana, to seek an amendment of the Mining Act so that royalties from the exploitation of the sulphur would be the same in principle as those established in the exploitation of oil fields.

The amendment would protect against unemployment that would result by the exploitation of the Sicilian sulphur by the Texas Sulphur Co. using the Frasch method. The Italian Ministry of Industry has requested Ente Zolfi Italiana to study the best means of incorporating the sulphur industry in the Vanoni Plan.

Pakistan Developments

PAKISTAN's heavy chemical industry is making steady progress and the country is reaching a state of self-sufficiency as regards some chemicals. The two caustic soda plants at Nowshera and Ghandragona which started production recently, each with a 10-ton-a-day capacity, means that home production can now meet all present domestic requirements. Chlorine from the Nowshera plant is utilised by the DDT plant there, and 700 tons of 100 per cent DDT will be produced each year.

Three sulphuric acid plants—one under private management—are being built. At Karnafulli, where a ten-ton-a-day capacity plant will be erected, all the sulphuric acid produced will be used by a nearby paper mill. A 20-ton-a-day plant at Lyallpur will convert a large percentage of its production into superphosphate, of which an output of 6,000 tons a year is expected.

Exhibition at Olympia

Chemical Engineering Firms on Show

MANY well known manufacturers of chemical plant and equipment will be showing their products at the Engineering, Marine and Welding Exhibition and at the Foundry Trades' Exhibition which are to be held at Olympia from 1 to 15 September.

A feature of the display on the stand of the Audley Engineering Company will be a number of demonstrations of the remote control of valves. Five individual methods are on show, including a photo-electric method which the company claim is of particular interest.

Valve lubrication is important and one demonstration will show the effect of Lubecote treatment of the valve surfaces in conjunction with a lubricant having film strength sufficient not to break down under pressure. The Lubecote process renders the valve surfaces more capable of retaining lubricant, and itself incorporates a medium with very low coefficient of friction.

Audco valves range in size from $\frac{1}{2}$ in. to 18 in. and are available for pressures from extreme vacuum to 5,000 psi.

Induction Furnace

Several furnaces will be shown by Birlec Ltd. Among these will be the 35 kW Birlec Tame unit, a low frequency induction furnace for aluminium, zinc and their alloys. It is claimed that this furnace will produce a very clean metal with only small losses. Another advantage is a consequence of the induction heating method. The heat is concentrated in the molten metal, and radiated heat and fumes are negligible, making for pleasant working conditions.

Also on show will be the Birlec HRP furnace which will handle large charges and maintain a temperature to $\pm 10^\circ\text{C}$ over a range of 700°C and $1,050^\circ\text{C}$. The Birlec Lectrodryers, which have previously been described in this journal (1955, 72, 1112) will also be shown. These dryers are non-chemical in action, drying being obtained by adsorption of moisture on activated alumina. When heated, alumina gives up adsorbed water without deterioration and consequently will last almost indefinitely.

The stand of the Morgan Crucible Company will display many products of interest

to engineers, technicians and designers, it is claimed.

By using an established melting principle a saving of up to one-third in fuel costs is possible for the Salamander Super crucibles. It is claimed that with existing furnace equipment longer life and increased output can be obtained.

Part of the stand will be devoted to Morgan Refractories Ltd., and will illustrate a wide range of refractory shapes and materials.

Key Industry Duty

THE Treasury has made an order under section 10(5) of the Finance Act 1926, continuing from 19 August, 1955, to 18 February, 1956, the exemption from Key Industry Duty of all the articles exempted from that duty by previous orders which expire on 18 August, 1955, with the addition of:—

Monocyclohexylamine, *p*-phenetidine, sorbitan monolaurate, sorbitan monopalmitate, sorbitan monostearate, sorbitan tri-stearate.

And with the deletion of:—

1-Aminopropan-2-ol, *d*-aminoisovaleric acid, barium hydroxide, *o*-chloromononitro benzene, *o*-dichlorohydrin *n*-dodecyl alcohol, *N*-monoethylaniline, ethylene glycol monobutyl ether, *n*-hexoic acid, lithium carbonate, methyl ethyl ketone, pentaerythritol, phenyl isocyanate, piperazine, styrene.

This Order is the Safeguarding of Industries (Exemption) (No. 6) Order, 1955, and is published as Statutory Instruments 1955 No. 1278. Copies of the Order may be obtained (price 4d. net, by post 5½d.) from HM Stationery Office.

Transforming Gas Into Oil

TESTS to transform gas into oil have just been started in South Africa by the South African Coal, Oil & Gas Co. If successful it is hoped to market the first lot of petrol in October, although Dr. Frans du Toit, chairman of the Industrial Development Corp., has said that tests in converters did not mean that petrol could be produced immediately. The production of petrol would absorb about two-thirds of SASOL's capacity, but if and when atomic power replaced the petrol engine the company would change over to the manufacture of the more profitable chemicals.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

THE interest in atomic energy is on the increase the world-over particularly in view of the Geneva Conference of Atomic Scientists. It is officially learnt that uranium deposits of low grade ore have been discovered in some parts of the Betul district in Madhya Pradesh. The ore analyses to 0.13 per cent uranium. The geological division of the Indian Atomic Energy Commission are understood to be examining the possibility of undertaking extensive prospecting of the area with a view to assessing the potentialities of the deposits. In the meanwhile the Government of India have announced a fresh policy for the purchase of uranium. All purchases of uranium ores are subject to the provisions of the Atomic Energy Act of 1948. In supercession of an earlier order of 1952 the Department of Atomic Energy announce that, 'The price schedules are inclusive of grade, premium, mine development allowance and also price for commercially recoverable value of any associated non-radioactive constituents of the ores such as cerium group of earths, niobium and tantalum, etc. These prices will be guaranteed for a period of five years commencing from 9 July, 1955.'

It was revealed in the Indian Parliament recently that the Geological Survey of India is conducting a detailed examination of the lignite deposit in Kashmir. At Umarsar in Kutch the proved reserves of brown coal discovered last year amount to 10-11,000,000 tons while an additional 4,000,000 tons are thought to be probably present. The Neiveli lignite deposits of South India are attracting immediate attention. A foreign firm of consultants appointed by the Union Ministry of Production has estimated that out of a 3,000,000 ton production of lignite annually it should be possible to produce 1,100,000 kWh of electric power, 200,000 tons of ammonium sulphate and 700,000 tons of briquetted fuel. The project is estimated to cost Rs.6,000,000 (£450,000) and operational investigations are in progress. It has recently been announced that under a supplementary operational agreement, the US Government will contribute \$498,500 for a joint project work on the lignite deposits.

The Government of India, it is learnt, have concluded negotiations with Montecatini, Italy's leading chemical concern, for a Rs.68,000,000 (£5,000,000) fertiliser plant to be built in the Sindri area. The project, the first contract of its kind in Asia to be given to Italy since the war, is for the production of azote fertilisers by a system devised by Professor Giacomo Fauzer, chemical engineer and vice-president of Montecatini. It is said that the application of these fertilisers has given 20 per cent higher yields in grains.

A new calcium carbide plant, the third in India, has just been erected and commissioned into production at Birlapur near Calcutta, by the Birla Jute Manufacturing Company. The present production is 7.5 tons a day but the plant has a rated capacity of 10 tons per day. The plant utilises limestone from Sylhet (Assam) and coke from Bihar. There are already two units each of 1,000 tons per annum capacity functioning at Tirunelveli (Madras) and Kottayam (Travancore). The former has been experimenting with wood charcoal while the latter has been trying coconut charcoal and sea-shell in producing the chemical. Meanwhile, the Central Electrochemical Research Institute at Karaikudi has found that carbonised briquettes from Niveli lignite are well suited for the manufacture of calcium carbide. The annual demand for the product in India, mainly for the production of acetylene, stands at about 8,000 tons and is met from imports. The Government have received applications from a Bombay firm for putting up an eight-ton a day plant and another from Andhra State for the manufacture of 24,000 tons per annum of calcium cyanamide.

A new plant to manufacture stable bleaching powder is under erection in the works of the Mettur Chemical and Industrial Corporation Ltd., Mettur Dam in South India. With this plant, the present production of 2,000 tons of bleaching powder per year is expected to be stepped up to about 6,000 tons by the end of the current year. The new production will be of stable quality and will meet the indigenous requirements in

full. The project is being engineered by Fredrich Uhde of West Germany.

* * *

The Government of India have approved the expansion schemes submitted by The Fertilisers and Chemicals Travancore Ltd., Alwaye, for doubling the existing capacity of the ammonia plant in their works at Alwaye and for producing increased quantities of ammonium sulphate and ammonium phosphate. The company is awaiting financial assistance from the Government of India. The company's production of ammonium sulphate in 1954 was 31,741 tons which is 4,221 tons over the previous year's production; in 1954 a quantity of 15,340 tons of ammonium phosphate was produced while the 1953 figure was a meagre 5,500 tons. The firm produced 34,375 tons of sulphuric acid during the past year.

* * *

The Dharangadhara Chemicals Ltd., Dharangadhara, have announced a fresh issue of Rs.30,00,000 (£2,250,000) for additional capital to install a new soda ash plant at Tuticorin in South India.

* * *

The Government of India have, on the recommendation of the Indian Tariff Commission, decided to continue protection granted to the titanium dioxide industry for a further period of two years, up to the end of the calendar year 1957. The revised rates of protective duty on titanium dioxide of 44 per cent *ad valorem* (standard) and 34 per cent *ad valorem* (preferential) would be effective from 2 July, 1955. The commission have, among other things, recommended that the Travancore Titanium Products Ltd. should, during the period of protection restrict their production to the anatase type, the country's requirements of the rutile pigment having to be met by imports.

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Change of Ministry

FROM 22 August, 1955, the following commodities will be dealt with by the Board of Trade instead of by the Ministry of Agriculture, Fisheries and Food as at present (i.e., the Board of Trade will become the 'Production Department' for these commodities):—

(1) Linseed and linseed oil (these were included under the heading 'Drying Oils' in the Directory of Production Departments and Commodities published in 1954);

(2) miscellaneous vegetable seeds and oils (including niger, perilla, poppy, rubber and safflower);

(3) sperm oil;

(4) soap;

(5) soapless detergents (these were described as 'proprietary soap substitutes' in the Directory referred to above);

(6) fatty acids, their salts and esters;

(7) dentifrices.

The commodities mentioned above either are not used in foodstuffs or are widely used outside the food industry, e.g. in the manufacture of paints, lubricants, candles, textiles, plastics, soap, cosmetics, waterproofing materials and fatty alcohols.

Chelsea Polytechnic Course

ON Tuesday, 27 September, Chelsea Polytechnic will start a course on 'The Chemistry & Microscopy of Food, Drugs & Water' under Mr. R. G. Minor, F.P.S., F.R.I.C. Other lecturers will be Mr. A. J. M. Bailey, B.Sc., F.R.I.C., M.P.S., Mr. D. Pearson, B.Sc., F.R.I.C., and Mr. W. R. Rankin.

The course which will extend over two complete sessions is based on the syllabus of the examination for the Fellowship of the Royal Institute of Chemistry (branch E). Enrolment is on Wednesday, 21 September, between six and eight p.m. and the fee is £4 4s. for each session, plus laboratory fee of 5s. and registration fee of 3s.

Canadian Petrochemicals

MONGARY Explorations Ltd., of Toronto, are to enter the petrochemical business. President G. A. McCartney announced that through the acquisition of controlling interest in Surpass Petrochemicals, a Toronto company, Mongary anticipates that it will become a substantial producer of petrochemicals not previously manufactured in Canada. Mongary originally was formed to participate in oil exploration in Western Canada.

One of the important products the company will produce will be lithium sterite grease for use in jet planes. Equipment for the production of these greases is now on order from the US. Several other products not now manufactured in Canada will be produced by Surpass through contracts and patent rights obtained from three US firms.

The Mellon Institute

Research into Pure & Applied Chemistry

MODERN research is more than a diligent pursuit of scientific facts and principles. . . . A duty of the scientist is to serve the community by making needed resources available and to demonstrate their most effectual use'. This quotation is from the introduction to a publication 'Scientific Research Activities of the Mellon Institute'. The introduction goes on to say that it is the scientist's responsibility to make certain that the consequences of abusing scientific knowledge will be plainly understood by all members of the community.

The Mellon Institute, Pittsburgh, Pa., is an endowed non-profit corporate body for conducting comprehensive investigations on important problems in the pure and applied natural sciences, for training research workers and for providing technical information adaptable to professional, public and industrial advantage.

Much of the research work being carried out by the Institute is concerned with chemistry, either basic or in its applications to other sciences and to industry.

A new electron microscope has been installed in the department of chemical physics and will be available for work both on electron microscopy and on electron diffraction.

Much of the work of this department is concerned with spectroscopic studies. For example a vibrational analysis of trifluoromethyl acetylene ($\text{CF}_3-\text{C}\equiv\text{C}-\text{H}$) is under way. This involves preparing and measuring the infra-red and Raman spectra of the compound. Considerable difficulty has been found in obtaining a sufficiently pure sample, but the infra-red spectrum is now fairly well determined and analysed.

Crystallisation Investigated

Investigations of crystallisation in stretched polybutadiene and silicones have been continued. At room temperatures these elastomers give no discernible crystalline diffraction effects on extension, but a significant redistribution of the intensity in the amorphous halo occurs so that the intensity along the axis of extension is less than that on the equator. This can be interpreted as arising from a degree of preferential orien-

tation of the polymer chains in the amorphous polymer.

Measurements to date indicate that the integrated intensity of the amorphous halo remains constant as the asymmetry increases with extension, a result which is anticipated theoretically.

Direct Beam Monitor

To compensate for unavoidable variations in the output of the X-ray generator a direct beam monitor has been added to the Norelco diffractometer. This adapts the apparatus for more precise investigations where very accurate intensity measurements are required. This equipment has proved invaluable in the study of carbon black structures and the crystallisation of elastomers, as previously mentioned.

Separation and purification studies are being carried out by the department of research in physical chemistry. Additional apparatus and instruments have been added for this work, especially for studies of thermal diffusion and chromatography. The laboratory now has six concentric tube thermal diffusion fractionators for the separation of liquids.

The effects of packing density and annular width on separating efficiency are also being studied, and a determination of the optimum column dimensions is being carried out.

Elution chromatography on alumina with graded eluents has been used extensively for the separation of certain constituents in coal by-products in an effort to analyse various fractions for the known carcinogen, 3,4-benzpyrene.

More recently an apparatus for vapour phase chromatography has been built. This equipment may be used for either adsorption with displacement development or partition chromatography. Helium, hydrogen or nitrogen may be used as the mobile phase with a sensitive thermal conductivity cell and a millivolt recorder as the detecting system. Effective separations and analyses have been made of hydrocarbon mixtures in the range C_4 to C_{16} . It is expected that procedures for analysing a variety of volatile organic compounds will be established.

Laboratory instruments are now in a state of rapid improvement, says the report of the department of instrumentation. Most measurements can now be used to give electrical, pneumatic or hydraulic signals which can be readily amplified.

Considerable help in the study of solutions may be obtained from the use of an automatic recording instrument for measuring surface tensions. When measured by the new instrument some solutions give a curve which resembles the stress-strain relationship of a plastic going through the yield point.

Standards for Medicinals

A large proportion of the work of the department of research in organic chemistry has been devoted to the development of standards for medicinal chemicals. The pharmacopeia laboratory has carried out a critical analysis of many well established but controversial procedures for quantitative analysis of pharmaceutical chemicals. It is well known that two analysts working on the same problem with the same method are apt to obtain different results. Even when the directions for the analysis have been carefully prepared in simple, straightforward terms, there is often misunderstanding of the precise significance of some expression.

The major effort of the laboratory was focused on the problem of providing adequate instructions, clearly set forth, leaving as little as possible to the imagination of any control chemist, however skilled. Much attention was paid to the development of uniform methods of control analysis for medicinal chemicals belonging to one family.

A division of microanalysis, with a newly furnished, precisely conditioned laboratory, is in process of development and should be in operation soon if not already. The two previously existing divisions of the department of analytical chemistry, analytical chemistry and microbiology, have also added to their facilities.

The staff of the analytical chemistry division have been called on to devise methods of analysis for products for which there were no previous methods in existence. Increased interest in the determination of trace constituents or analyses of micro-samples has led to extensive applications of polarographic and spectrophotometric techniques, frequently requiring the development of new procedures.

Simplification or increased accuracy has been obtained for many familiar analytical procedures by the substitution of glass fibre filter papers for organic fibre ones.

Photomicrographs have been obtained by the department of microbiology and microscopy of many new plastics and synthetic fibres, as well as clay products, and both protected and unprotected metal surfaces. The effects of dyes and sizing processes on cellulosic and synthetic fibres were studied by microscopic procedures. Colour photomicrographs of certain chemical crystals have been taken by the use of transmitted and oblique illumination by both direct and polarised light.

A fellowship on silicon carbide, which is being maintained by the Carborundum Company, Niagara, NY, has produced a greater knowledge of the potentialities of this important product. Investigations were carried out on a number of systems containing silicon carbide and other materials at elevated pressures. Data have been obtained in this way of use in evaluating this compound for applications in which chemical stability is required. As a result of this work some of the important data in earlier literature were found to be incorrect.

Another fellowship sponsored by the Carborundum Company has investigated laboratory methods for the production of a number of zirconium compounds.

The development of new and enlarged uses for nickel compounds and catalysts is the objective of the multiple fellowship of the International Nickel Company of New York. One possibility that has been studied is the use of oil-soluble nickel compounds as lubricant additives.

Crop Protection Conference

IN conjunction with the Ministry of Agriculture, the Association of British Insecticide Manufacturers, the British Agricultural Contractors' Association, and the National Farmers' Union, the Society of Chemical Industry (Pesticides Group) will hold a National Crop Protection Conference at the Winter Gardens, Eastbourne, on 31 October to 3 November.

The conference will cover the practical aspects of the uses of insecticides and fungicides in agriculture and horticulture and all papers presented will be by the invitation of the executive committee.

• HOME •

More Lines

The telephone number of the Solartron Electronic Group at Thames Ditton, Surrey, has been changed to Emberbrook 5522. This has been done so that the number of lines available could be increased from five to 10.

Gas Council's Exhibit

Feature of the Gas Council's stand at the Engineering, Marine & Welding Exhibition at Olympia, from 1 to 15 September, will be a working exhibit demonstrating the use of oxy-tow gas for flame hardening.

T.I. Fellows & Associates

Two fellows and 99 associates were elected at the August meeting of the Textile Institute's council.

Distillers AGM

The next annual general meeting (the 78th) of the Distillers Co. Ltd. will be held in the North British Station Hotel, Edinburgh, on Friday, 16 September, 1955, at 12.15 p.m.

Smog Research

Experiments in preventing and dispersing smog will be intensified shortly when a special smog chamber is completed at Woolwich Arsenal. Experiments are now being conducted in a small-scale smog chamber in the laboratories of Battersea Polytechnic, whose chemists will continue the research at Woolwich. Quickfit & Quartz Ltd. are supplying the glass apparatus of all types, from capillary tubing to flowmeters, which will measure the rate of passage of fog into the chamber.

New Candle Filter

After several years' research on filtering mediums Berkefeld Filter & Water Softeners Ltd. have patented and marketed the Sterasyl filter, a development of the original kieselguhr candle filter made by the company.

ECGD Head to Visit US, Canada

The Comptroller-General of the Export Credits Guarantee Department, Mr. Rowland Owen, C.M.G., will be visiting North America during September. In the course of visits to New York, Los Angeles, San Francisco, Chicago, Washington, Ottawa, and Montreal, he will have discussions with various official, banking, and trade groups and will discuss the conditions under which ECGD operates in the territory.

International Plans New Factory

The International Chemical Co. Ltd., of Braydon Road, London, N.16, are planning to build a factory and research laboratory at Havant, Hants.

The Royal Sanitary Institute

The Royal Sanitary Institute which was founded in 1876 has changed its name to the Royal Society for the Promotion of Health. Revised qualifications (in brackets) are: F.R.San.I. (F.R.S.H.), M.R.San.I. (M.R.S.H.), A.R.San.I. (A.R.S.H.), Affil. R.San.I. (Affil. R.S.H.).

Fuel Efficiency Exhibition

A record number of firms, nearly 100, will demonstrate solid and liquid fuel economy for all branches of industry at the Fuel Efficiency Exhibition to be held in the City Hall, Manchester, in October.

Spraypak Tower Packing

In our article last week (see p. 369) on Spraypak tower packing (which was first described in *THE CHEMICAL AGE*, 1954, 70, 1301) we omitted to mention that this product is manufactured in this country by Costain-John Brown Ltd., 73 South Audley Street, London W.1, The Hydronyl Syndicate Ltd., 14 Gloucester Road, London S.W.7, The British Ceca Co. Ltd., 175 Piccadilly, London W.1, and several other companies.

Lever Brothers Support College Course

A full-time course for students who hold the Higher National Certificate in chemistry has been arranged by Birkenhead Technical College. Lever Brothers (Port Sunlight) Ltd., announce that as part of their policy of encouraging employees to acquire technical qualifications, they will offer two scholarships for this course, which covers a period of one academic year—September to June. Port Sunlight employees who qualify for the scholarship will be granted leave without pay during the period of the course, but they will receive emoluments at the rate of £500 a year to cover living and other expenses. The company will pay all class and examination fees and will make a monetary award to each successful student.

• OVERSEAS •

Work Started on Ontario Acid Plant

Work has begun on a sulphuric acid plant to be built for Noranda Mines on the Indian Reserve at Cutler, 20 miles east of Blind River, in Northern Ontario. The plant will be in production by July next year.

Mexican Cellulose Film

Production of transparent cellulose film will begin in Monterrey, Mexico, early in September. Last year Mexico imported 2,166 tons. The production rate of the new plant will be 1,800 metric tons a year.

Rayonier's Expansion Plans

Rayonier Inc., the US rayon firm which recently bought 80 per cent of the common stock of Alaska Pine, announces that it intends spending about \$80,000,000 in the next three years on new projects. These include building a 100,000-ton chemical cellulose plant, a \$1,000,000 plant at Marpole, Vancouver, to manufacture Rayflo, a lubricant made from hemlock bark for use in oil drilling, and expanding the pulp mill at Port Alice, Vancouver Island, at a cost of \$8,000,000.

Brazilian Sterling Remittance

The British embassy in Rio de Janeiro reports that a further sterling remittance of £1,000,000 has been authorised under the Anglo-Brazilian payments agreement. This brings the total of remittances authorised up to about £20,500,000, and covers all applications for the remittance of sterling which were approved by the Bank of Brazil up to and including 11 August, 1952.

German Partners

In its 7 May issue **THE CHEMICAL AGE** reported that the W. R. Grace Company of New York in conjunction with two other companies would build a \$5,000,000 chemical plant in the Sao Paulo region of Brazil. The initial partnership to carry out the construction with Farwerke Hoechst AG sharing equal participation, and the American Home Products Corp. participating to a smaller degree, has been revised. The American Home Products Corp. has dissolved its partnership, and a company, the Fongra Produtos Quimicos SA has been formed jointly by W. R. Grace and Farwerke Hoechst AG. Full production is planned by 1957.

Kwinana to Have Official Opening

The Kwinana oil refinery which began production on 1 February this year will be officially opened on 25 October by Sir William Slim, Governor-General of Australia.

Oil in Borneo

Oil has been found at a comparatively shallow depth at Jerudong in Borneo. About 45 miles north-east of the Seria oilfield, the discovery is the most promising in the course of post-war exploration drilling in British Borneo.

To Build Chlorine-Caustic Soda Plant

Mr. R. Lindley Murray, president of Hooker Chemicals and of the Hooker Electro-Chemical Co., of Niagara Falls, New York, has said that a chlorine-caustic soda plant will be built in North Vancouver at a cost of \$11,000,000. The plant will be operating by 1957 and will serve the pulp industry, oil refineries, chemical producers and adhesive manufacturers.

Olin Mathieson Chemical Corp.

Sales of Olin Mathieson Chemical Corp. in the US and Canada increased by approximately 12 per cent in the three months ended 30 June 1955, compared with the same period last year. Net income showed a gain of about 11 per cent. Sales for the second quarter amounted to \$142,103,684, compared with \$126,468,943 last year, and earnings came to \$10,998,502, compared with \$9,938,631 the previous year. These totals all reflect the acquisition of Blockson Chemical Co., which was formally completed during the second quarter of this year.

Coal-Chemical Production Falls

Reporting on its survey of the US coke and coal chemicals industry last year the US Bureau of Mines, a department of the interior, says that markets for most coal chemicals remained fairly good during the year, with prices remaining about the same as in 1953. The decline in coke production, which began at the end of 1953 and continued into 1954 reached a low point in August. This decline reduced output of coal-chemical materials and ammonia production fell by 15 per cent, crude tar by 14 per cent, and crude light oil by 17 per cent.

• PERSONAL •

MR. J. E. P. DUNNING and MR. R. J. LEES have been promoted deputy chief scientific officers of the Ministry of Supply.

It is announced that MR. GILBERT DODD has been appointed to the board of directors of Monsanto Plastics Ltd. Mr. Dodd, who has been general manager of Monsanto Plastics Ltd. since its formation, is well known in the plastics industry both at home and abroad. He joined Monsanto's sales division in 1939. In 1949 he was appointed manager of the plastics department.

MR. P. R. R. COAD has been appointed a director of H. J. Enthoven & Sons.

MR. F. A. CLEMISON, who joined the staff of Triplex Safety Glass Co. when he retired from the Royal Navy in 1948, has been made sales manager.

MR. J. A. L. YOUNG who has been personnel director of I.C.I.'s Billingham division since February was among those who recently received I.C.I. long service awards, having completed 20 years' service with the company. Mr. Young became secretary of I.C.I.'s pension fund in 1947 and was appointed head of the pensions department in July, 1951.

MR. A. E. S. GOURLAY, A.M.I.Mech.E., M.I.Mar.E., has been appointed technical sales representative in Scotland to the Sheepbridge Group of Companies. He will operate from 46 Hazelwood Avenue, Newton Mearns, Renfrewshire, the telephone number of which is Newton Mearns 3267. For the past 16 years, Mr. Gourlay has been a director and the general manager of Clews Petersen Ltd., one of the southern companies of the Sheepbridge Engineering Group.

Sharples Centrifuges Ltd. announce the appointment of MR. G. G. JACKSON, B.Sc., as a chemical engineer based on the company's Tower House laboratories at Stroud. Mr. Jackson was formerly with the Atomic Energy Research Establishment at Harwell, and will now be particularly concerned with Sharples' field tests and the technical advisory section's work.

Three vice-presidential appointments at Battelle Institute, Columbus, Ohio, were announced by DR. CLYDE WILLIAMS, Institute president and director. Named were DR. B. D. THOMAS, DAVID C. MINTON, Jr., and JOHN S. CROUT. All three have long been associate directors of the research organisation, and, along with Dr. Williams, comprise the key policy-making and executive team in Battelle management. 'This formalises the official status of our top management team', said Dr. Williams in announcing the appointments. 'These men, originally trained as scientists and engineers, have worked closely with me in welding the 2,500 people who comprise our organisation into a harmonious group. Through a diversity of talents in the skills required for sound administration and growth, our executive team has been able to bring to problems a unique approach which combines the viewpoints and judgments of businessmen and technical men. These three men, with their diverse technical backgrounds and experience, first in research in their chosen fields and then in management, make a real team'. Dr. Thomas is a physical chemist; Mr. Minton, a mining and metallurgical engineer; Mr. Crout, a mechanical engineer. Dr. Williams was employed first in the chemical industry and then in the steel industry.

Obituary

MR. F. G. PENNY, M.I.C.E., M.I.Mech.E., managing director of International Combustion (Holdings) Ltd., and chairman of the Aberdare Cable (Holdings) Ltd., died recently at Derby, aged 66. Mr. Penny joined International Combustion in 1926 when he returned from Shanghai where he had been general engineer with the Shanghai Electric Co.

Will

MR. PERCY JAMES RADFORD, Alberton, All Saints Road, Cheltenham, secretary and works manager of the United Chemists' Association Ltd., left £3,341 (£1,347 net).

Publications & Announcements

THE *Journal of Scientific Instruments* for August, an official publication of the Institute of Physics, contains an article by D. Ambrose, B.Sc., Ph.D., and R. R. Collerson of the Chemical Research Laboratory, Teddington, Middlesex, about a thermal conductivity gauge for use in gas-liquid partition chromatography. The work they describe has been carried out as part of the research programme of the Chemical Research Laboratory at Teddington.

FLUORESCENT whitening agents are discussed in an article by Dr. R. Thomas in the current issue of *Progress*, the magazine published by Unilever. Dr. Thomas describes them as the most spectacular advance in the manufacture of washing products in the past 10 years. When introduced in minute quantities into soap or soapless detergent solution in which clothes are being washed, they are retained by the fabric, in a similar way as a dye is taken up, to give it a whiter and brighter appearance. How do these fluorescent whitening agents work? Dr. Thomas says emphatically, 'they are not bleaches'. To understand their operation requires more than a little elementary optics, Dr. Thomas claims.

SIGMAMOTOR pumps have a wide range of applications in the US chemical industry and in laboratory work. They are valveless and the manufacturers, Sigmacmotor Inc. of New York, claim that the transfer of impurities from pump to fluid is impossible as the fluid being pumped does not come into direct contact with the pump parts. These pumps can now be bought in Britain as V. A. Howe & Co., of London, announce that they are now importing them.

TWICE a year the Copper Development Association publishes *Technical Survey*, a booklet which gives a comprehensive review of recent technical developments in the production, properties, and applications of copper and its alloys, together with a bibliography. A free copy will be mailed to any reader writing to Copper Development Association, Kendals Hall, Radlett, Herts, with a request to be placed on the mailing list.

THE many uses of nickel and its alloys in electronic engineering are discussed in a series of articles appearing in the June/July issue of *The Nickel Bulletin* published by the Mond Nickel Co. Ltd. which is now circulating. It also reports on investigations made into the physical properties of nickel and its use as a catalyst in the petroleum industry.

* * *

IN recent years the chemical industry has been the most progressive in installing automatic process controls, say Baird & Tatlock in their current edition of *Bulletin & Laboratory Notes*, a fact which has prompted the firm to devote most of its attention to the chemical industry. Details of their newly-designed equipment for the chemical industry is illustrated in the bulletin with a feature article on the B.T.L. Analmatic which can replace the work of routine analysis.

* * *

SOME aspects of the botany, chemistry and medicinal uses of *Rauwolfia* are discussed in *Colonial Plant and Animal Products*, 1955, 5 [1]. This plant and its active principles have aroused great interest in the last few years because of their value in the treatment of high blood pressure and related conditions. Also in this number is an article on 'West African Insecticides' in which is surveyed the insecticides in use by the people of West Africa. Many of these are quite harmless to human beings and are in fact often used for poisoning fish which are afterwards eaten.

* * *

A NEW PTFE flexible tube and pipe unit is being manufactured by Bowden (Engineers) Ltd., Victoria Road, London N.W.10. This unit has been produced with the collaboration of I.C.I., manufacturers of Fluon. Components made in this material are suitable for use in the temperature range -100° C to $+250^{\circ}$ C. The tube maintains full flexibility over this range, and under some circumstances the upper limit may be extended to as high as 300° C. Fluon is also resistant to oils, hydraulic fluids, fuels, acids, alkalis and solvents and is light, stable and non-wetting. These factors coupled with its non-inflammability will make these tubes very suitable for use in the aircraft industry claim the makers.

British Chemical Prices

(These prices are checked with the manufacturers, but it must be pointed out that in many cases there are variations according to quantity, quality, place of delivery, etc.)

LONDON.—There has been little change in the general price position during the past week and the call for industrial chemicals has been maintained at a satisfactory level for the period. A renewed interest in textile chemicals has been reported and there has been a moderate weight of fresh buying for the other consuming industries. Export trade is a little better with a good volume of inquiry chiefly from Commonwealth destinations. Demand in the coal tar products market is keeping pace with production for such items as creosote oil, phenol and cresylic acid, and the light products also find a ready outlet. Pitch is again attracting interest with a fair inquiry for later delivery.

MANCHESTER.—Contract deliveries of heavy chemicals to consumers in the Lancashire and West Riding areas have been re-

ported during the past week to be on a reasonably good scale, with traders on the Manchester market handling a fair flow of fresh inquiries from home users. There has been also some buying interest on export account. Apart from one or two sections trade fertilisers continues at a seasonally low level. Among the by-products creosote oil, crude and refined tar, and carbolic acid are meeting with a steady demand.

GLASGOW.—The Scottish chemical market opened on a rather quieter note, but towards the latter part of the week a steady improvement has to be reported. Increased production costs are still having their effect on prices, and manufacturers are reluctantly having to increase these. The export market still continues to be very satisfactory, with a good volume of inquiries being received.

General Chemicals

Acetic Acid.—Per ton : 80% technical, 10 tons, £83 ; 80% pure, 10 tons, £89 ; commercial glacial, 10 tons, £91 ; delivered buyers' premises in returnable barrels (technical acid barrels free) ; in glass carboys, £7 ; demijohns, £11 extra.

Acetic Anhydride.—Ton lots d/d, £123 per ton.

Alum.—Ground, about £25 per ton, f.o.r. MANCHESTER : Ground, £25.

Aluminium Sulphate.—Ex works, £14 15s. per ton d/d. MANCHESTER : £14 10s. to £17 15s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—2-cwt. non-returnable drums : 1-ton lots, £49 per ton.

Ammonium Chloride.—Per ton lot, in non-returnable packaging, £27 17s. 6d.

Ammonium Nitrate.—D/d, £31 per ton (in 4-ton lots).

Ammonium Persulphate.—MANCHESTER : £6 5s. per cwt. d/d.

Ammonium Phosphate.—Mono- and di-, ton lots, d/d, £97 and £94 10s. per ton.

Antimony Sulphide.—Crimson, 4s. 4d. to 4s. 9½d. ; golden, 2s. 7½d. to 4s. 0½d. ; all per lb., delivered UK in minimum 1-ton lots.

Arsenic.—Per ton, £45 to £50 ex store.

Barium Carbonate.—Precip., d/d : 4-ton lots, £39 per ton ; 2-ton lots, £39 10s. per ton, bag packing.

Barium Chloride.—£42 15s. per ton in 2-ton lots.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £42 10s. per ton d/d ; 2-ton lots, £43 per ton d/d.

Bleaching Powder.—£27 17s. 6d. per ton in returnable casks, carriage paid station, in 4-ton lots.

Borax.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, anhydrous, £60 ; granular, £40 ; crystal, £42 10s. ; powder, £43 10s. ; extra fine powder, £44 10s. ; BP, granular, £49 ; crystal, £51 10s. ; powder, £52 10s. ; extra fine powder, £53 10s.

Boric Acid.—Per ton for ton lots, in hessian sacks, carriage paid : Technical, granular, £68 10s. ; crystal, £76 10s. ; powder, £74 ; extra fine powder, £76 ; BP granular, £81 10s. ; crystal, £88 10s. ; powder, £86 ; extra fine powder, £88.

Calcium Chloride.—Per ton lots, in non-returnable packaging : solid, £15 ; flake, £16.

Chlorine, Liquid.—£36 7s. 6d. per ton, in returnable 16-17-cwt. drums, delivered address in 3-drum lots.

Chromic Acid.—2s. 0½d. per lb., less 2½%, d/d UK, in 1-ton lots.

Chromium Sulphate, Basic.—Crystals, 7½d. per lb. delivered (£73 10s. per ton).

Citric Acid.—1-cwt. lots, £10 5s. cwt.

Cobalt Oxide.—Black, delivered, bulk quantities, 13s. 2d. per lb.

Copper Carbonate.—2s. 9d. per lb.

Copper Sulphate.—£108 15s. per ton f.o.b., less 2% in 2-cwt. bags.

Cream of Tartar.—100%, per cwt., about £11 12s.

Formaldehyde.—£37 5s. per ton in casks, d/d.

Formic Acid.—85%, £86 10s. in 4-ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1.260 S.G., £13 3s. 6d. to £13 14s. 6d. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hydrochloric Acid.—Spot, about 12s. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. 3d. to 1s. 6d. per lb.

Hydrogen Peroxide.—27.5% wt. £124 10s. per ton. 35% wt. £153 per ton d/d. Carboys extra and returnable.

Iodine.—Resublimed B.P., 17s. 7d. per lb., in 28-lb. lots.

Iodoform.—£1 6s. 7d. per lb., in 28-lb. lots.

Lactic Acid.—Pale tech., 44 per cent by weight, 14d. per lb. ; dark tech., 44 per cent by weight, 8½d. per lb., ex-works ; chemical quality, 44 per cent by weight, 12½d. per lb., ex-works ; 1-ton lots, usual container terms.

Lead Acetate.—White : About £142 10s. per ton.

Lead Nitrate.—About £132 10s. 1-ton lots.

Lead, Red.—Basis prices per ton. Genuine dry red, £135 10s. ; orange lead, £147 10s. Ground in oil : red, £153 15s. ; orange, £165 15s.

Lead, White.—Basis prices : Dry English in 5-cwt. casks, £140 10s. per ton. Ground in oil : English, 1-cwt. lots, 178s. per cwt.

Lime Acetate.—Brown, ton lots, d/d, £40 per ton ; grey, 80-82%, ton lots, d/d, £45 per ton.

Litharge.—£137 10s. per ton, in 5-ton lots.

Magnesite.—Calcined, in bags, ex-works, about £21 per ton.

Magnesium Carbonate.—Light, commercial, d/d, 2-ton lots, £84 10s. per ton, under 2 tons, £92 per ton.

Magnesium Chloride.—Solid (ex-wharf), £16 per ton.

Magnesium Oxide.—Light, commercial, d/d, under 1-ton lots, £245 per ton.

Magnesium Sulphate.—Crystals, £16 per ton.

Mercuric Chloride.—Technical Powder, £1 8s. 9d. per lb., in 5-cwt. lots ; smaller quantities dearer.

Mercury Sulphide, Red.—£1 11s. 3d. per lb., for 5-cwt. lots.

Nickel Sulphate.—D/d, buyers UK £170 per ton. Nominal.

Nitric Acid.—80° Tw., £35 per ton.

Oxalic Acid.—Home manufacture, minimum 4-ton lots, in 5-cwt. casks, about £130 per ton, carriage paid.

Phosphoric Acid.—Technical (S.G. 1.700) ton lots, carriage paid, £92 per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 3½d. per lb.

Potash, Caustic.—Solid, £93 10s. per ton for 1-ton lots ; Liquid, £36 5s.

Potassium Carbonate.—Calcined, 96/98%, about £74 per ton for 1-ton lots, ex-store.

Potassium Chloride.—Industrial, 96%, 1-ton lots, about £24 per ton.

Potassium Dichromate.—Crystals and granular, 1s. 1d. per lb., in 1-ton lots, d/d UK.

Potassium Iodide.—B.P., 14s. 1d. per lb. in 28-lb. lots ; 13s. 7d. in cwt. lots.

Potassium Nitrate.—In 4-ton lots, in non-returnable packaging, paid address, £63 10s. per ton.

Potassium Permanganate.—B.P., 1-cwt. lots, 1s. 9d. per lb. ; 3-cwt. lots, 1s. 8½d. per lb. ; 5-cwt. lots, 1s. 8d. per lb. ; 1-ton lots, 1s. 7½d. per lb. ; 5-ton lots, 1s. 7½d. per lb. ; Tech., 5-cwt. packed in 1-cwt. drums, £8 14s. 6d. per cwt. ; packed in 1 drum, £8 9s. 6d. per cwt.

Sal ammoniac.—Per ton lot, in non-returnable packaging, £45 10s.

Salicylic Acid.—MANCHESTER : Technical 2s. 7½d. per lb. d/d.

Soda Ash.—58% ex-depot or d/d, London station, about £15 5s. 6d. per ton, 1-ton lots.

Soda, Caustic.—Solid 76/77% ; spot, £26 to £28 per ton d/d (4 ton lots).

Sodium Acetate.—Commercial crystals, £91 per ton d/d.

Sodium Bicarbonate.—Per ton lot, in non-returnable packaging, £15 10s.

Sodium Bisulphite.—Powder, 60/62%, £41 to £43 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—Per ton lot, in non-returnable packaging, paid address £59 5s.

Sodium Chlorate.—About £75 per ton in free 1-cwt. drums, carriage paid station, in 4-ton lots.

Sodium Cyanide.—96/98%, £113 5s. per ton lot in 1-cwt. drums.

Sodium Dichromate.—Crystals, cake and powder, 10½d. per lb. Net d/d UK, minimum 1-ton lots; anhydrous, 1s. 0½d. per lb. Net del. d/d UK, minimum 1-ton lots.

Sodium Fluoride.—Delivered, 1-ton lots and over, £4 15s. per cwt.; 1-cwt. lots, £5 5s. per cwt.

Sodium Hyposulphite.—Pea crystals £34 15s. a ton; commercial, 1-ton lots, £31 10s. per ton, carriage paid.

Sodium Iodide.—BP, 17s. 1d. per lb. in 28-lb. lots.

Sodium Metaphosphate (Calgon).—Flaked, loose in metal drums, £127 per ton.

Sodium Metasilicate.—£24 per ton, d/d UK in ton lots, loaned bags.

Sodium Nitrate.—Chilean Industrial, over 98% 6-ton lots, d/d station, £27 10s.

Sodium Nitrite.—£32 per ton (4-ton lots).

Sodium Percarbonate.—12½% available oxygen, £8 2s. 10½d. per cwt. in 1-cwt. drums.

Sodium Phosphate.—Per ton d/d for ton lots: Di-sodium, crystalline, £37 10s., anhydrous, £81; tri-sodium, crystalline, £39 10s., anhydrous, £79.

Sodium Silicate.—75-84° Tw. Lancashire and Cheshire, 4-ton lots, d/d station in loaned drums, £10 15s. per ton; Dorset, Somerset and Devon, £3 17s. 6d. per ton extra; Scotland and S. Wales, £3 per ton extra. Elsewhere in England, excluding Cornwall, and Wales, £1 12s. 6d. per ton extra.

Sodium Sulphate (Glauber's Salt).—About £8 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground, £6 per ton d/d station in bulk. MANCHESTER: £6 10s. per ton d/d station.

Sodium Sulphide.—Solid, 60/62%, spot, £33 2s. 6d. per ton, d/d, in drums; broken, £33 2s. 6d. per ton, d/d, in drums.

Sodium Sulphite.—Anhydrous, £59 per ton; pea crystals, £37 12s. 6d. per ton d/d station in kegs; commercial, £23 7s. 6d. per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £20 to £22, according to fineness.

Sulphuric Acid.—Net, naked at works, 168° Tw. according to quality, per ton, £10 7s. 6d. to £12; 140° Tw., arsenic free, per ton, £8 12s. 6d.; 140° Tw., arsenious, per ton, £8 4s. 6d.

Tartaric Acid.—Per cwt.: 10 cwt. or more £13 15s.

Titanium Oxide.—Standard grade comm., with rutile structure, £162 per ton; standard grade comm., £142 per ton.

Zinc Oxide.—Maximum price per ton for 2-ton lots, d/d, white seal, £107; green seal, £105; red seal, 2-ton lots, £103 per ton.

Solvents & Plasticisers

Acetone.—Small lots: In 5-gal. cans: 5-gal., £125 10-gal. and upward, £115, cans included. In 40/45 gal. returnable drums, spot: Less than 1 ton, £90; 1 to less than 5 tons, £87; 5 to less than 10 tons, £86; 10 tons and upward, £85. In tank wagons, spot: 1 to less than 5 tons (min. 400 gal.), £85; 5 to less than 10 tons (1,500 gal.), £84; 10 tons and upward (2,500 gal.), £83; contract rebate, £2. All per ton d/d.

Butyl Acetate BSS.—£159 per ton, in 1-ton lots; £167 per ton, in 10-ton lots.

n-Butyl alcohol, BSS.—10 tons, in drums, £143 per ton d/d.

sec-Butyl Alcohol.—5 gal. drums £159; 40 gal. drums: less than 1 ton £124 per ton; 1 to 10 tons £123 per ton; 10 tons and over £119 per ton; 100 tons and over £120 per ton.

tert-Butyl Alcohol.—5 gal. drums £195 10s. per ton; 40/45 gal. drums: less than 1 ton £175 10s. per ton; 1 to 5 tons £174 10s. per ton; 5 to 10 tons, £173 10s.; 10 tons and over £172 10s.

Diacetone Alcohol.—Small lots: 5 gal. drums, £177 per ton; 10 gal. drums, £167 per ton. In 40/45 gal. drums: less than 1 ton, £142 per ton; 1 to 9 tons, £141 per ton; 10 to 50 tons, £140 per ton; 50 to 100 tons, £139 per ton; 100 tons and over, £138 per ton.

Dibutyl Phthalate.—In drums, 10 tons, 2s. per lb. d/d; 45 gal. drums, 2s. ½d. per lb. d/d.

Diethyl Phthalate.—In drums, 10 tons, 1s. 11½d. per lb. d/d; 45 gal. drums, 2s. 1d. per lb. d/d.

Dimethyl Phthalate.—In drums, 10 tons, 1s. 9d. per lb. d/d; 45 gal. drums, 1s. 10½d. per lb. d/d.

Diocetyl Phthalate.—In drums, 10 tons, 2s. 8d. per lb. d/d; 45 gal. drums, 2s. 9½d. per lb. d/d.

Ether BSS.—In 1 ton lots, 1s. 11d. per lb.; drums extra.

Ethyl Acetate.—10 tons lots, d/d, £128 per ton.

Ethyl Alcohol (PBS 66 o.p.).—Over 300,000 p. gal., 2s. 9d.; 2,500-10,000 p. gal., 2s. 11½d. per p. gal., d/d in tankers. D/d in 40/45-gal. drums, 1d. p.p.g. extra. Absolute alcohol (75.2 o.p.) 5d. p.p.g. extra.

Methanol.—Pure synthetic, d/d, £43 15s. per ton.

Methylated Spirit.—Industrial 66° o.p. : 500 gal. and over in tankers, 4s. 10d. per gal. d/d; 100-499 gal. in drums, 5s. 2½d. per gal. d/d. Pyridinised 64 o.p. : 500 gal. and over in tankers, 5s. 0d. per gal. d/d; 100-499 gal. in drums, 5s. 4½d. per gal. d/d.

Methyl Ethyl Ketone.—10-ton lots, £133 per ton d/d; 100-ton lots, £131 per ton d/d.

Methyl isoButyl Ketone.—10 tons and over £159 per ton.

isoPropyl Acetate.—In drums, 10 tons, £123 per ton d/d; 45 gal. drums, £129 per ton d/d.

isoPropyl Alcohol.—Small lots : 5-gal. drums, £118 per ton; 10-gal. drums, £108 per ton; in 40-45 gal. drums; less than 1 ton, £83 per ton; 1 to 9 tons £81 per ton; 10 to 50 tons, £80 10s. per ton; 50 tons and over, £80 per ton.

Rubber Chemicals

Carbon Bisulphide.—£61 to £67 per ton, according to quality.

Carbon Black.—8d. to 1s. per lb., according to packing.

Carbon Tetrachloride.—Ton lots, £76 10s. per ton.

India-Rubber Substitutes.—White, 1s. 5½d. to 1s. 9½d. per lb.; dark, 1s. 4d. to 1s. 6½d. per lb. delivered free to customers' works.

Lithopone.—30%, about £54 per ton.

Mineral Black.—£7 10s. to £10 per ton.

Sulphur Chloride.—British, about £50 per ton.

Vegetable Lamp Black.—£64 8s. per ton in 2-ton lots.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Nitrogen Fertilisers

Ammonium Sulphate.—Per ton, in 6-ton lots, d/d farmer's nearest station: March to June, £18.

Compound Fertilisers.—Per ton in 6 ton lots, d/d farmer's nearest station, I.C.I. Special No. 1. January to June, £25 14s.

'Nitro-Chalk.'—£15 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean agricultural for 6-ton lots, d/d nearest station: August to September £26 5s.

Coal-Tar Products

Benzole.—Per gal., minimum of 200 gals. delivered in bulk, 90's, 5s.; pure, 5s. 4d.

Carbolic Acid.—Crystals, 1s. 4d. to 1s. 6½d. per lb. Crude, 60's, 8s. MANCHESTER: Crystals, 1s. 4½d. to 1s. 6½d. per lb., d/d crude, 8s. naked, at works.

Creosote.—Home trade, 1s. to 1s. 9d. per gal., according to quality, f.o.r. maker's works. MANCHESTER: 1s. to 1s. 8d. per gal.

Cresylic Acid.—Pale 99/99½%, 5s. 10d. per gal.; 99.5/100%, 6s. per gal. D/d UK in bulk: Pale A.D.F. from 6s. 5d., per Imperial gallon, f.o.b.

Naphtha.—Solvent, 90/160°, 4s. 10d. per gal.; heavy, 90/190°, 3s. 9½d. per gal for bulk 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots.

Naphthalene.—Crude, 4-ton lots, in buyers' bags, £17 5s. to £28 7s. per ton nominal, according to m.p.; hot pressed, £40 per ton in bulk ex-works; refined crystals, £56 10s. per ton d/d, mis. 4-ton lots.

Pitch.—Medium, soft, home trade, £9 per ton f.o.r. suppliers' works; export trade about £10 10s. per ton f.o.b. suppliers' port.

Pyridine.—90/160°, £1 2s. 6d. to £1 5s. per gal.

Toluole.—Pure, 5s. 7d.; 90's, 4s. 10d. per gal. d/d. MANCHESTER: Pure, 5s. 7d. per gal. naked.

Xylole.—For 1000-gal. lots, 5s. 10d. to 6s. per gal., according to grade, d/d London area in bulk.

Intermediates & Dyes (Prices Nominal)

m-Cresol 98/100%.—4s. 3d. per lb. d/d.

o-Cresol 30/31° C.—1s. 4d. per lb. d/d.

p-Cresol 34/35° C.—4s. 3d. per lb. d/d.

Dichloraniline.—4s. 1d. per lb.

Dinitrobenzene.—88/89° C., 1s. 11d. per lb.

Dinitrotoluene.—S.P. 15° C., 1s. 11½d. per lb.; S.P. 26° C., 1s. 3d. per lb. S.P. 33° C., 1s. 1½d. per lb.; S.P. 66/68° C., 1s. 9d. per lb.

p-Nitraniline.—4s. 7d. per lb.

Nitrobenzene.—Spot, 9½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

Nitronaphthalene.—2s. per lb.

o-Toluidine.—1s. 9d. per lb., in 8/10-cwt. drums, drums extra.

p-Toluidine.—5s. 6d. per lb., in casks.

Dimethylaniline.—3s. 1d. per lb., drums extra, carriage paid.

Chemical & Allied Stocks & Shares

STOCK markets have developed a reactionary trend, and many leading industrial shares recorded losses ranging from 2s. to 10s. compared with a month ago. The reaction has been almost as rapid as the advance earlier in the year which carried many shares to new high record levels. Selling was much smaller than might have been deduced from the downward swing in prices, but on the other hand, buying interest has fallen away considerably. This was due to the continued uncertainty whether Mr. Butler will have to propose additional measures to check inflation and strengthen the value of the £. There has been talk in the City of a further increase in the Bank rate, and also of possibilities of an autumn Budget and increased taxation.

Trend Reflected

Chemical and kindred shares have reflected the surrounding trend in stock markets very closely. Share prices have moved back with the general tendency, despite reports that most sections of the industry are continuing to show an upward trend in earnings because so far increased output is offsetting the effects of rising costs. There appears to be a fairly widespread tendency to await the interim dividend of Imperial Chemical Industries, due next month. It is not expected the interim dividend will be raised above last year's 4 per cent, as it is assumed that any question of an increase will be left until the final payment. Nevertheless the disposition is to take the view that there is a good possibility of a small rise in the total dividend for the year if the trend in general economic conditions is satisfactory. The interim dividend news is awaited with special interest because it is likely to be accompanied by a half-yearly progress report.

Reflecting the downward trend in share prices, however, Imperial Chemical were 52s. 1½d. compared with 55s. a month ago. Highest and lowest prices for I.C.I. shares this year have been 61s. 9d. and 39s. 1½d. Compared with a month ago, Monsanto 5s. shares have receded from 34s. 3d. to 30s. 6d., Laporte 5s. shares from 22s. 6d. to 20s. 6d. and Fisons from 62s. to 59s. 9d. There was again considerable activity in Albright & Wilson 5s. shares, which, how-

ever, were unable to move against the surrounding tendency in stock markets, and were 23s. 3d., or 3s. lower than a month ago. Reichhold Chemical 5s. shares were 20s. or only 6d. lower compared with a month ago. Lawe's Chemical 10s. shares at 15s. 17½d. have been a steady feature on the rise in profits from £110,041 to £122,213, and the maintained 10 per cent dividend on larger capital.

Anchor Chemical 5s. shares have been steady, helped by the interim dividend, and at 13s. 9d. xd were within 3d. of the level ruling a month ago. In other directions, Yorkshire Dyeware & Chemical 5s. shares at 11s. 6d. were only 6d. easier on balance. The 10s. shares of Hickson & Welch remained active, but at 26s. 6d. were 1s. 9d. lower than a month ago. Hardman & Holden 5s. shares with a reaction on the month from 14s. 6d. to 13s. 6d. also reflected the general trend of markets.

Brotherton were a good feature, these 10s. shares with a rise on the month from 39s. to 40s. 6d. having moved against the general trend. Among other shares, Coalite & Chemical 2s. units at 4s. 6d. were maintained on balance. F. W. Berks 5s. shares at 9s. 9d. have come back from 10s. 7½d. Ashe Chemical 1s. shares kept around 1s. 6d. As usual there has been a considerable business in Borax Consolidated deferred units, which, however have moved down from 140s. a month ago to 130s. 9d. xd.

Plastics Shares

Among plastics shares, British Xylonite came back on the month from 46s. 3d. to 44s. British Industrial Plastics 2s. shares were firm at 6s. 7½d. which compared with 6s. 6d. a month ago. British Glues & Chemicals 4s. units moved back on balance from 15s. 7½d. to 15s. Among other shares, British Chrome Chemicals 5s. shares were 13s. 1½d. against 14s. a month ago. Unilever came back on balance from 96s. to 92s. and the 6s. 8d. units of the Distillers Co. have receded from 28s. 3d. a month ago to 26s. 10½d.

There has been a very big business in oil shares, which, however after reaching new peak levels, reacted sharply. Shell, for instance, were 134s. 4½d., compared with 146s. 10½d. a month ago.

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

ANDURA ROSS & CO. LTD., London W., manufacturers of plastics.—15 July, charge, to Barclays Bank Ltd. securing all moneys due or to become due to the bank; charged on factory premises, Station Road, Littlestone-on-Sea. *Nil. 10 July, 1954.

FERGUSON EDWARDS LTD., London W., paint manufacturers.—13 July, £15,000 charge, to W. W. Fox, London & others; charged on lands at Abbey Road, Barking, with cottages numbered 84, 86, 88, 90 Abbey Road, and other buildings and warehouses thereon. *£44,432. 31 December, 1952.

PLASTOCRAFT PRODUCTS (DARWEN) LTD., plastics manufacturers.—22 July, charge, to Barclays Bank Ltd. securing all moneys due or to become due to the bank; charged on Whitehall Mill, Darwen, and rent charges, etc. *£4,000 bankers. 26 August, 1954.

RENTOKIL LTD., Leatherhead, Surrey, makers of insecticides, etc.—18 July, by order on terms, £2,000 mortgage, to Peckham Mutual Building Society; charged on land & building at School Lane, Fetcham, Surrey (except mines & minerals lying at a depth greater than 200 feet). *£12,130. 1 March, 1955.

RIPOLIN LTD., London W.C., paint manufacturers, etc.—15 July, debenture to Barclays Bank Ltd. securing all moneys due or to become due to the bank; general charge. *Nil. 23 July, 1954.

Satisfactions

ALUMINIUM CORPORATION LTD., Conway. Satisfaction 15 July, of debentures registered 8 October, 1951, to the extent of £50,000.

PLYSU PRODUCTS LTD., Woburn Sands, plastics, etc.—Satisfactions, 19 July, £1,900,

part of £6,900 registered 24 March, 1948, of mortgage registered 9 June, 1948, and further charged registered 9 May, 1950.

Increases of Capital

SAVORY & MOORE LTD., 61 Welbeck Street, W.1, by £300,000, in 150,000 six per cent cumulative preference and 150,000 ordinary shares of £1, beyond the registered capital of £900,000.

CHEMIDUS PLASTICS LTD. (formerly Enthoven Chemicals Ltd.), 89 Upper Thames Street, E.C.4, increased by £40,000, in £1 ordinary shares, beyond the registered capital of £10,000.

G. CUSSONS LTD., manufacturers of laboratory apparatus, etc., John Street, Lower Broughton, Salford 7, increased by £14,000, in £1 ordinary shares, beyond the registered capital of £6,000.

MIRVALE CHEMICAL CO. LTD., Steanard Lane, Mirfield, Yorks increased by £50,000, in £1 ordinary shares, beyond the registered capital of £50,000.

Changes of Name

MARLOW CHEMICALS LTD., to AMINES LTD., and ALLEN & LLOYD (WHOLESALE) LTD., manufacturing chemists, to ALDERSHOT WAREHOUSES LTD.

New Registrations

Valley Pestaid Co. Ltd.

Private company (553,362). Capital £100. To carry on the business of horticultural and agricultural pest controllers, etc. Directors: Ronald G. Wicks and Derek E. Shelton. Reg. office: Prospect Nursery, Old Nazeing Road, Broxbourne, Herts.

De-Corrosion Services (Norwest) Ltd.

Private company (553,119.) Capital £5,000 in £1 shares. To acquire any interests in any patents, licences, concessions and the like conferring an exclusive or non-exclusive or limited right to use within the County Palatine of Lancaster and the County of Chester, or any secret or other information as to an Alkaline Electrolytic process; and to carry on the business of removers of mill scale, grease, paints, rust, cement, carbonaceous matter and other surface deposits

on metal by electro-chemical, chemical or mechanical methods, electro, nickel and chromium platers and metal platers generally, mechanical and electrical engineers, etc. Subscribers: Stephen S. C. Meikle, Alfred G. Owen and A. N. Other. Reg. office: 2/6 St. Johns Road, Bootle, Liverpool 20.

H. Sells & Co. (Nottingham) Ltd.

Private company (552,583). Capital £4,000. To carry on the business of manufacturers of and dealers in industrial and commercial powders, crystals, pastes, liquids, cements, adhesives, etc. Directors: Benjamin Sells, Ralph Sells, Hilda M. Sells and Jessie G. Sells. Registered office: Lea Street, Alfreton Road, Nottingham.

Company News

Negretti & Zambra Ltd.

At a meeting of the board of Negretti & Zambra Ltd. an interim dividend of 3 per cent was declared on the ordinary capital of the company. The chairman, Mr. P. A. Negretti, said that results to date continue to be satisfactory and that the volume of orders received is greater than ever.

Farbwerke Hoechst AG.

The annual general meeting of Farbwerke Hoechst AG was held recently in Frankfurt/Main. The company did well in 1954 and in almost every section production capacity was fully utilised. In a number of cases demand was in excess of supply. Total turnover was DM.1,127,000,000 (£95,000,000), an increase of 19.5 per cent compared with 1953. Exports flourished, reaching a total of DM.338,000,000 (£28,800,000). This equalled 30 per cent of the total turnover, shared equally by countries in Europe and overseas. In the same period turnover of Western German chemical industry rose by 13 per cent.

Du Pont of Canada

Estimated net profit of Du Pont of Canada Securities Ltd., and its wholly owned subsidiary, Du Pont Co. of Canada Ltd., for the first half of 1955 was \$3,217,000 or 44 cents per common share. This compared with \$2,724,000, or 37 cents a share in the last half of 1954. Sales to customers for the period were \$31,485,000 against \$27,986,000 in the previous six months. Depreciation provision was approximately the

same at \$2,215,000, compared with \$2,141,000 in the 1954 period, while income tax was slightly higher at \$3,015,000 against \$2,719,000. Earned surplus stood at \$22,373,000 on June 30, 1955, compared with \$20,678,000 on 31 December, 1954. Du Pont Co. of Canada Ltd. is one of two successor companies of Canadian Industries Ltd. which was segregated on 1 July, 1954, into two separate entities.

Celanese Corporation of America

Net income of Celanese Corp. of America for the first six months of 1955, after all charges and taxes, amounted to \$7,221,797, equivalent to 83 cents a common share after preferred stock dividends. This compared with net income of \$1,314,024 in the first six months of 1954 which, after provision for preferred stock dividends, resulted in a deficit of 18 cents a common share. For the three months period ended 30 June, 1955, net income after charges and taxes amounted to \$3,310,483, equal to 36 cents a share on the common stock after preferred stock provisions. Net sales for the first six months of the year aggregated \$93,248,262, contrasted with \$66,297,838 in the same period last year. For the June quarter of this year, sales were \$47,396,582. The increase in net sales for the first six months as compared with a year ago was attributed by Mr. Harold Blanck, president, to increasing business in chemicals and plastics as well as the improvement of business in the textile industry.

International Nickel Co. of Canada Ltd.

The report of The International Nickel Co. of Canada Ltd. and subsidiaries for the six months ended 30 June, 1955, shows net earnings, in terms of US currency, of \$45,329,911 after all charges, depreciation, depletion, taxes, etc., equivalent, after preferred dividends, to \$3.04 per share on the common stock. For the corresponding first six months of 1954 net earnings were \$32,586,185, or \$2.16 per share of common, and for the last six months of 1954 they were \$32,709,001, or \$2.18 per common share. At its meeting on 1 August the directors declared a dividend of 65 cents a share on the common stock, an increase of 10 cents a share over the amount paid in the two previous quarters and 15 cents a share over the regular quarterly dividend of 50 cents paid starting in the third quarter of 1951 continuing through 1954.

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

UNIVERSITY OF MANCHESTER
THE NEXT SESSION COMMENCES ON
THURSDAY, 6TH OCTOBER, 1955

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order, 1952.

QUALIFIED CHEMIST required for North Midlands Laboratories. Experience in the Chemistry of Germicides and Sanitary Chemicals essential. Responsibility for maintenance of quality standards, some development research. Experience in supervision and control of the laboratory team. Salary according to qualifications and experience. Write, stating age, with full details of career and qualifications, to **BOX No. C.A. 3423, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

SENIOR CHEMICAL ENGINEER OR CHEMIST for developing and marketing Petroleum Plant, required by The Power-Gas Corporation, Ltd., Stockton-on-Tees. Age about 30 years. The appointment will be confirmed on a permanent basis if satisfactory after a trial period of twelve months. It is anticipated that the post will involve periodic journeys abroad and in making the appointment emphasis will be placed on ability to grasp new ideas and techniques, together with initiative and common sense.

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5 NEW TWIN ROLL SPRAY DRIERS. Chilled cast-iron rolls 40 in. long by 32 in. diam. 74 lb. sq. in. w.p., fitted air-cooled doctor blades, rotary disc distribution trough, air spray jets and worm discharge conveyors. Fitted stainless steel feed pump, jacketed feed tank and powder dresser.

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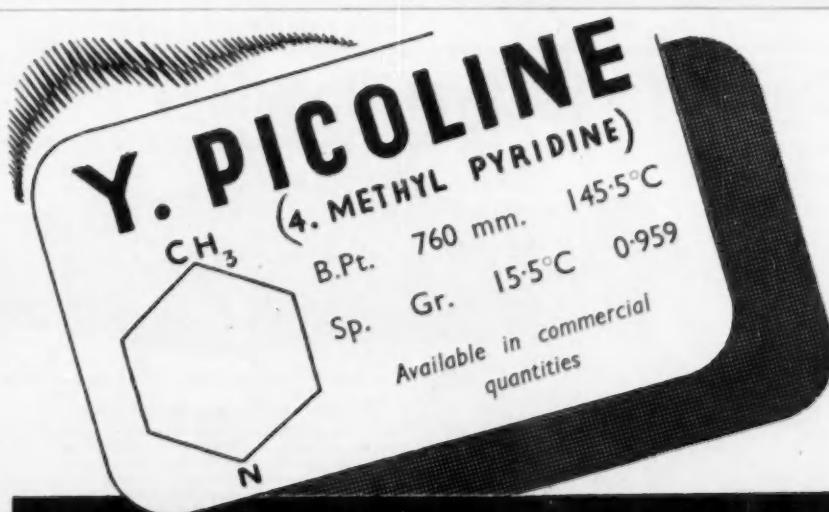
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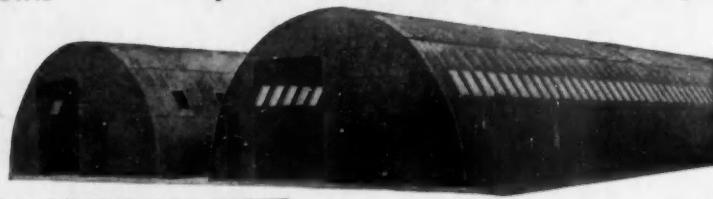
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... will FLUOROCARBONS be the answer?

“Fire”, the tiger of the skyways has not yet been banished from aircraft—and scientists the world over are still seeking a complete solution to this menace. Fluorocarbons may well provide the answer and would seem to offer the highest possibilities of evolving completely fire-proof aircraft.

Investigations have shown that Fluorocarbon liquids can replace the inflammable fluids at present used in hydraulic control systems and de-icing equipment. Lubricants too can be made of Fluorocarbons—in addition, the application of Fluorocarbons to high speed bearings and inflammable paints is well within the bounds of possibility.

ANHYDROUS HYDROFLUORIC ACID · HYDROFLUORIC ACID
 BORON TRIFLUORIDE · BENZOTRIFLUORIDE · FLUOSULPHONIC ACID
 The above compounds are of great value in the manufacture of fluorinated materials and are available in commercial quantities. Industrial applications include catalysts, lubricants, plastics and specialised welding.

Should you have any problems or theories on these or any other applications please consult us.



PIONEERS IN FLUORINE
 DEVELOPMENT

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